FIG.1

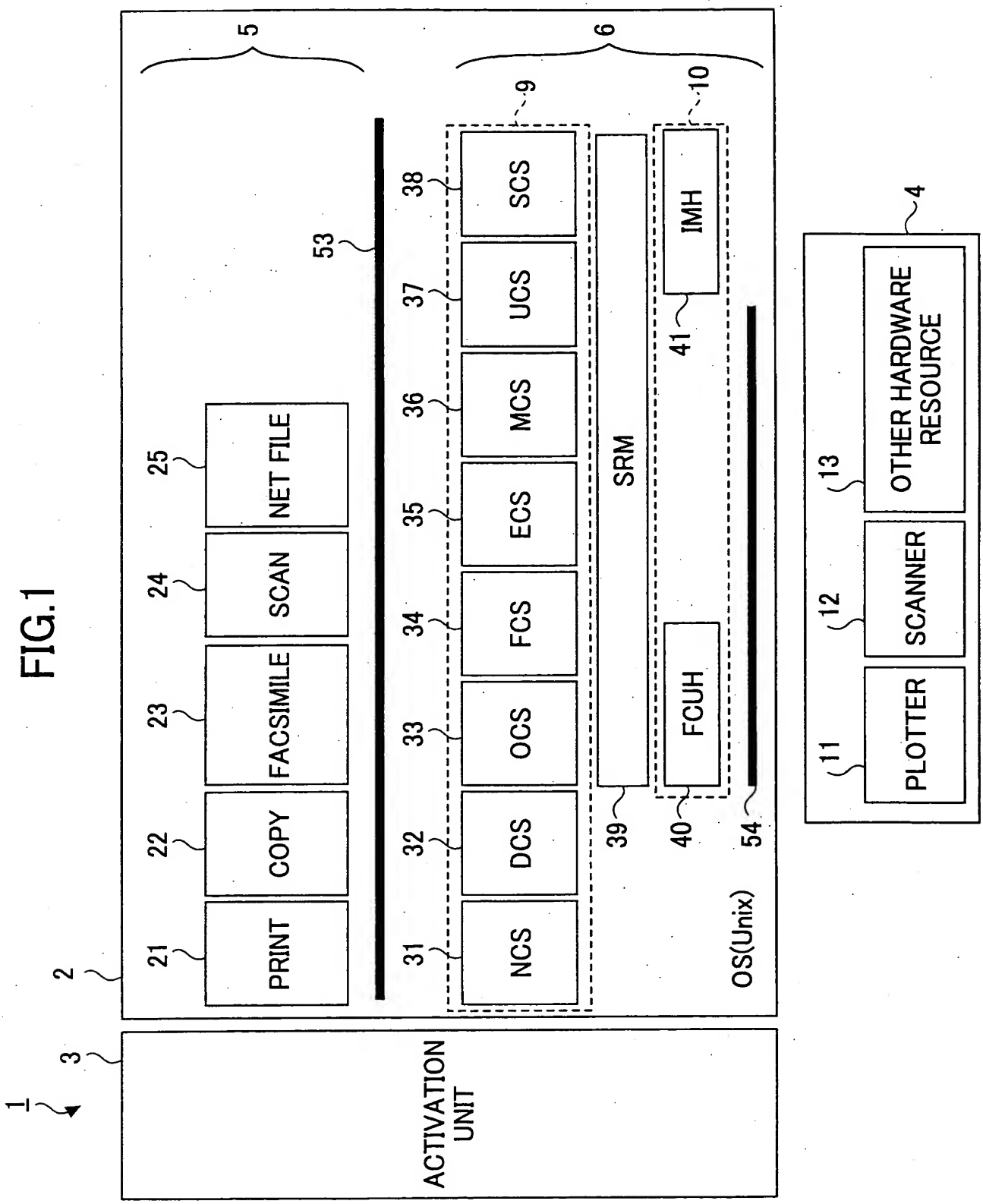

1
2
3
ACTIVATION UNIT
5
6
9
10
PRINT
COPY
FACSIMILE
SCAN
NET FILE
21
22
23
24
25
NCS
DCS
OCS
FCS
ECS
MCS
UCS
SCS
31
32
33
34
35
36
37
38
53
SRM
39
FCUH
40
IMH
41
OS(Unix)
54
4
PLOTTER
SCANNER
OTHER HARDWARE RESOURCE
11
12
13

FIG.2

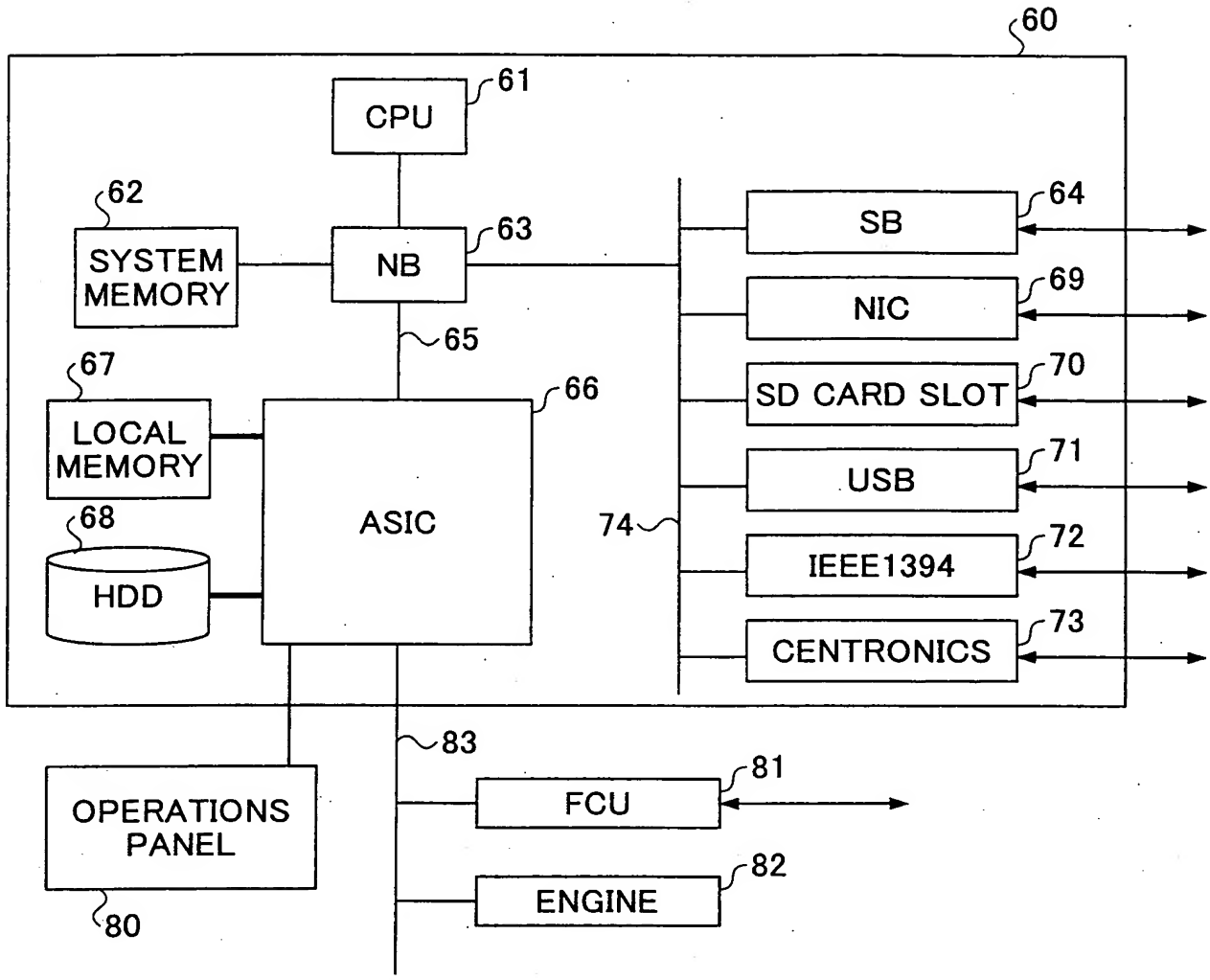

60
CPU
61
62
SYSTEM MEMORY
NB
63
65
SB
64
NIC
69
SD CARD SLOT
70
67
LOCAL MEMORY
66
ASIC
USB
71
68
HDD
74
IEEE1394
72
CENTRONICS
73
83
OPERATIONS PANEL
80
FCU
81
ENGINE
82

FIG.3

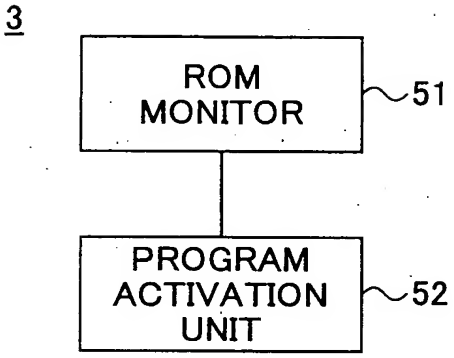


FIG.4

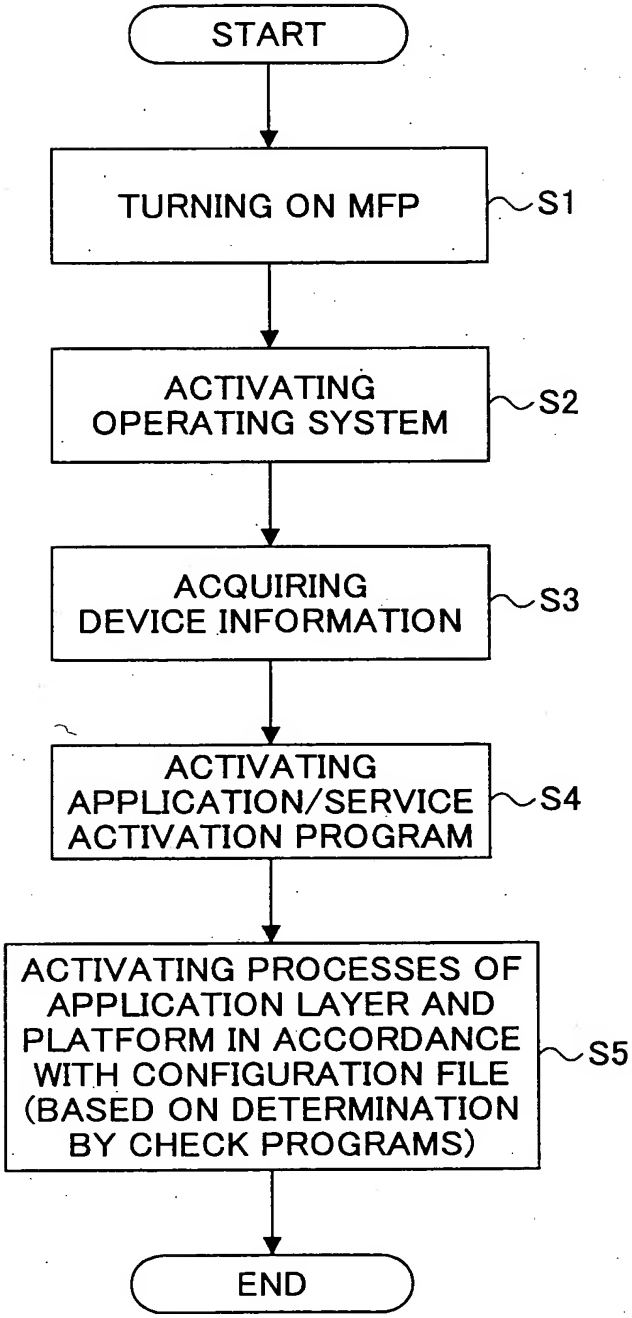

START
TURNING ON MFP
S1
ACTIVATING OPERATING SYSTEM
S2
ACQUIRING DEVICE INFORMATION
S3
ACTIVATING APPLICATION/SERVICE ACTIVATION PROGRAM
S4
ACTIVATING PROCESSES OF APPLICATION LAYER AND PLATFORM IN ACCORDANCE WITH CONFIGURATION FILE (BASED ON DETERMINATION BY CHECK PROGRAMS)
S5
END

FIG.5

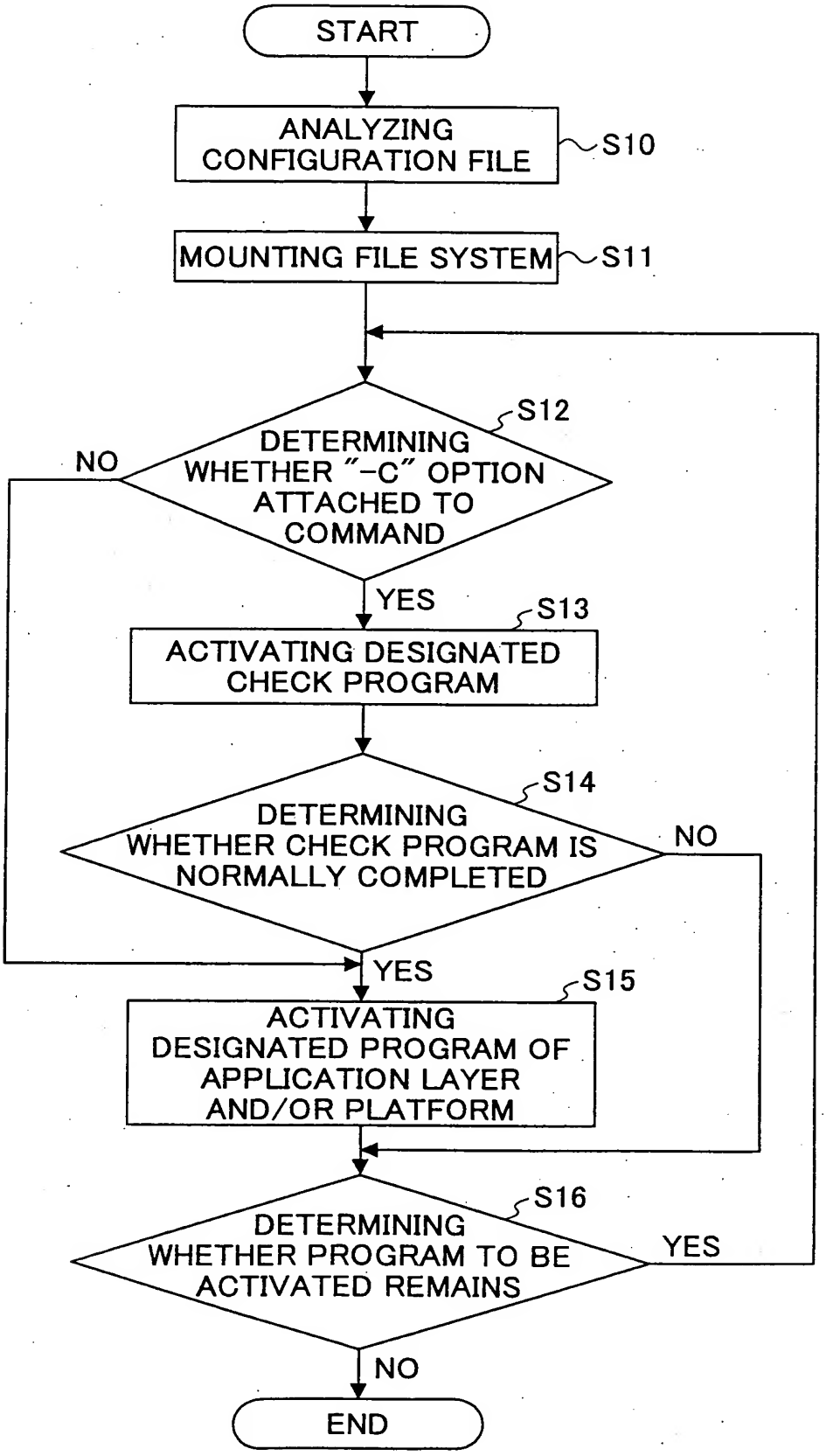

START
ANALYZING CONFIGURATION FILE
S10
MOUNTING FILE SYSTEM
S11
S12
DETERMINING WHETHER "-C" OPTION ATTACHED TO COMMAND
NO
YES
S13
ACTIVATING DESIGNATED CHECK PROGRAM
S14
DETERMINING WHETHER CHECK PROGRAM IS NORMALLY COMPLETED
NO
YES
S15
ACTIVATING DESIGNATED PROGRAM OF APPLICATION LAYER AND/OR PLATFORM
S16
DETERMINING WHETHER PROGRAM TO BE ACTIVATED REMAINS
YES
NO
END

FIG.6

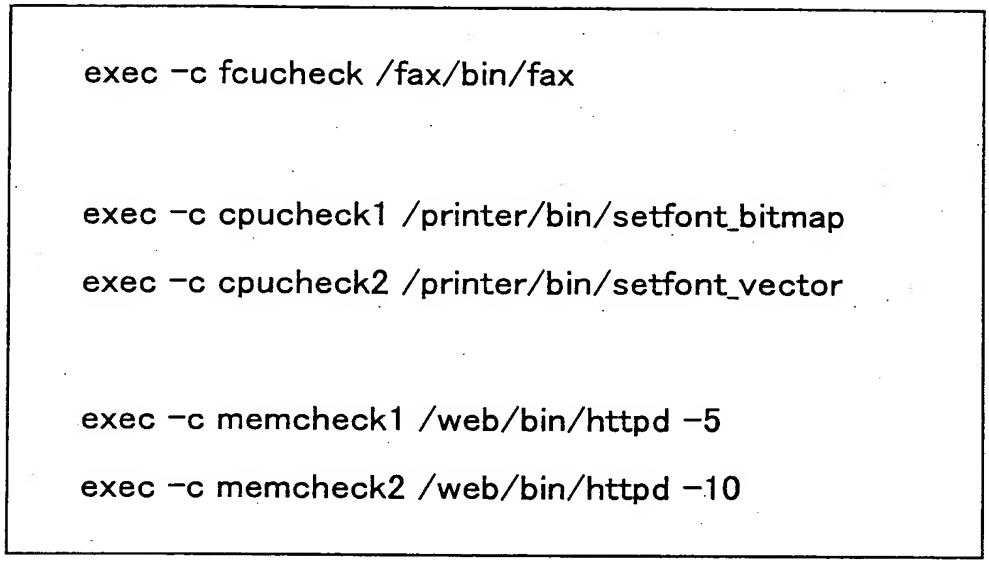

exec -c fcucheck /fax/bin/fax
exec -c cpucheck1 /printer/bin/setfont_bitmap
exec -c cpucheck2 /printer/bin/setfont_vector
exec -c memcheck1 /web/bin/httpd -5
exec -c memcheck2 /web/bin/httpd -10

FIG.7

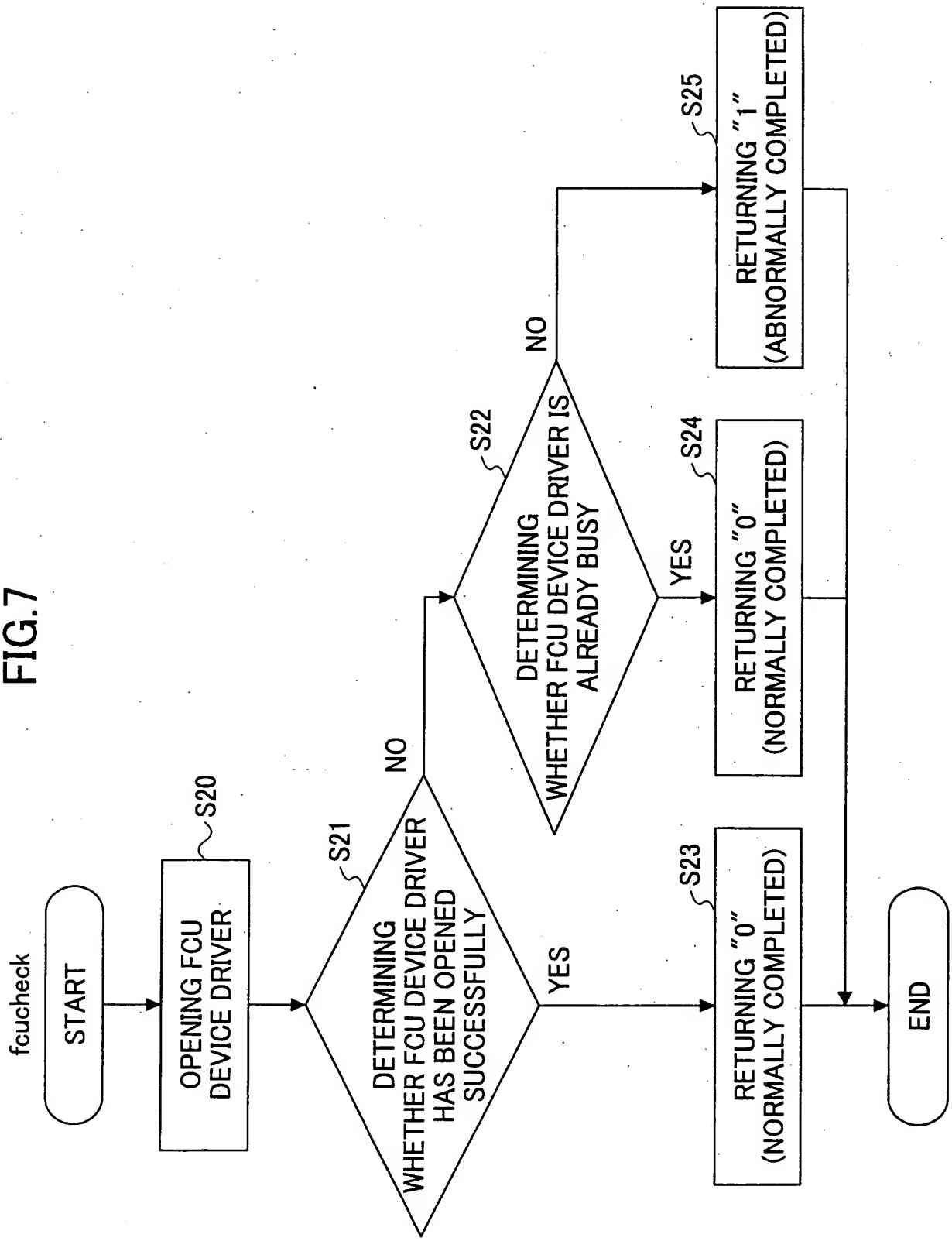

fcucheck
START
S20
OPENING FCU DEVICE DRIVER
S21
DETERMINING WHETHER FCU DEVICE DRIVER HAS BEEN OPENED SUCCESSFULLY
NO
S22
DETERMINING WHETHER FCU DEVICE DRIVER IS ALREADY BUSY
NO
YES
YES
S23
RETURNING "0" (NORMALLY COMPLETED)
S24
RETURNING "0" (NORMALLY COMPLETED)
S25
RETURNING "1" (ABNORMALLY COMPLETED)
END

FIG.8

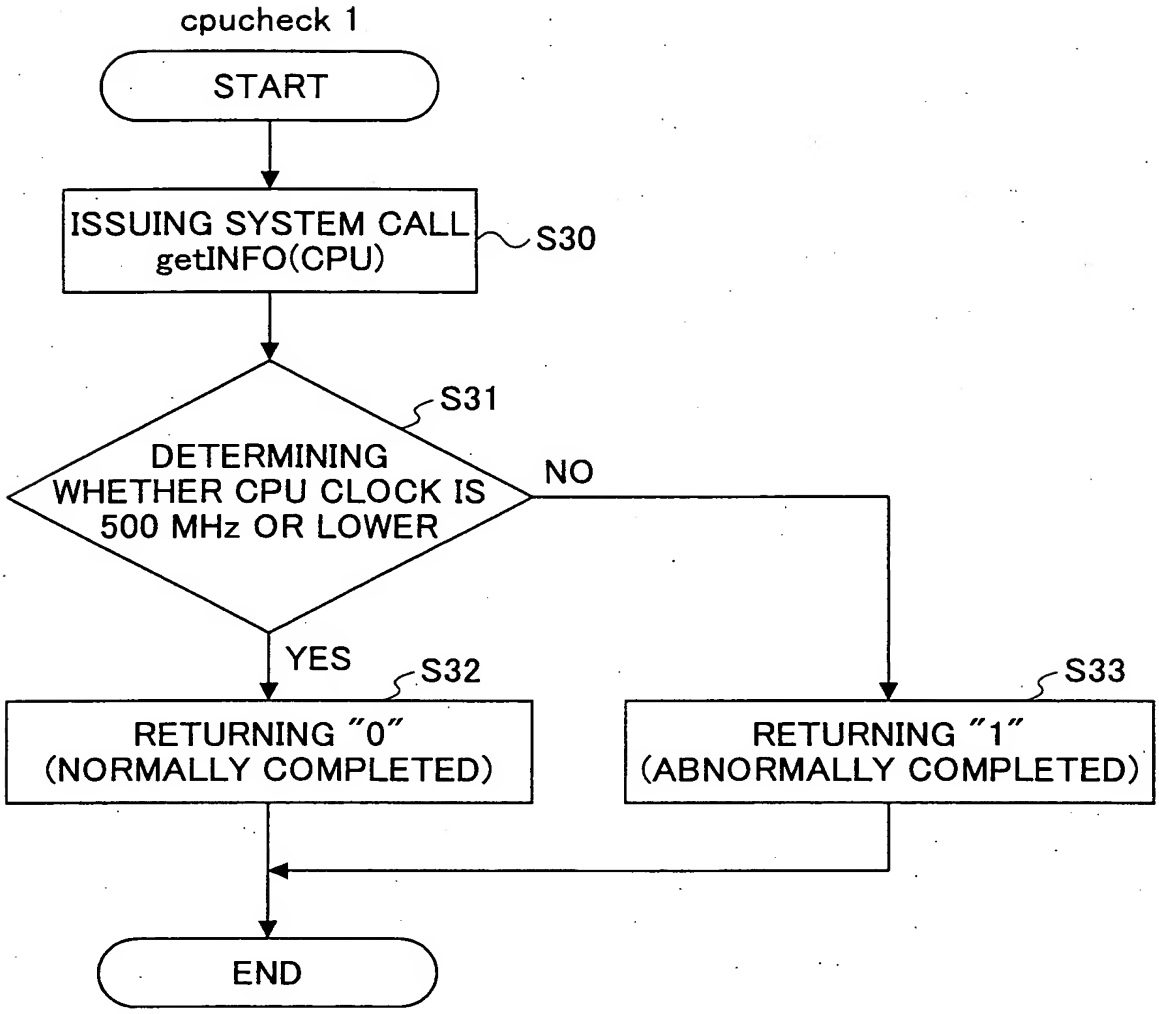

cpucheck 1
START
ISSUING SYSTEM CALL
getINFO(CPU)
S30
S31
DETERMINING
WHETHER CPU CLOCK IS
500 MHz OR LOWER
NO
YES
S32
S33
RETURNING "0"
(NORMALLY COMPLETED)
RETURNING "1"
(ABNORMALLY COMPLETED)
END

FIG.9

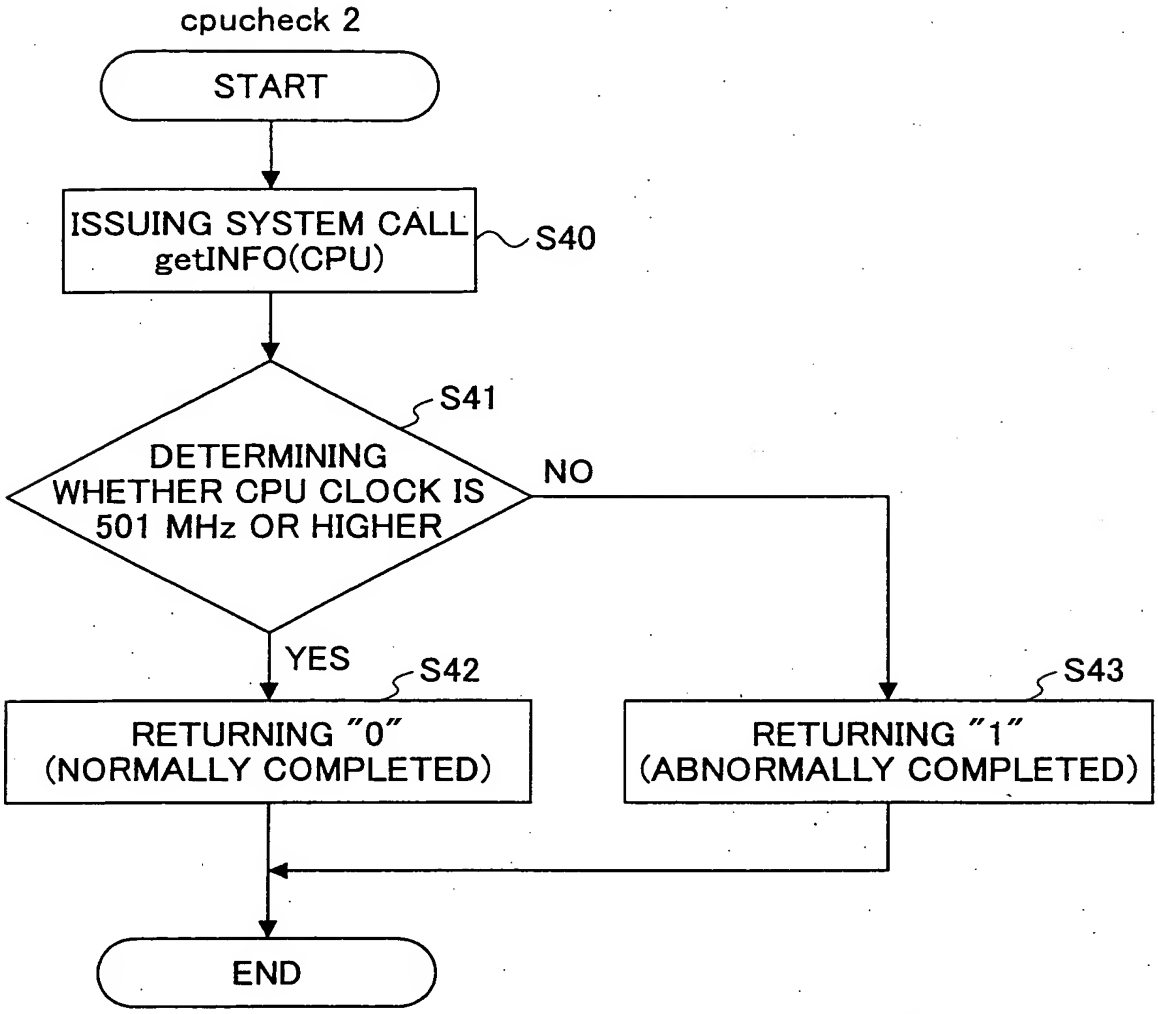

cpucheck 2
START
ISSUING SYSTEM CALL
getINFO(CPU)
S40
S41
DETERMINING
WHETHER CPU CLOCK IS
501 MHz OR HIGHER
NO
YES
S42
S43
RETURNING "0"
(NORMALLY COMPLETED)
RETURNING "1"
(ABNORMALLY COMPLETED)
END

FIG.10

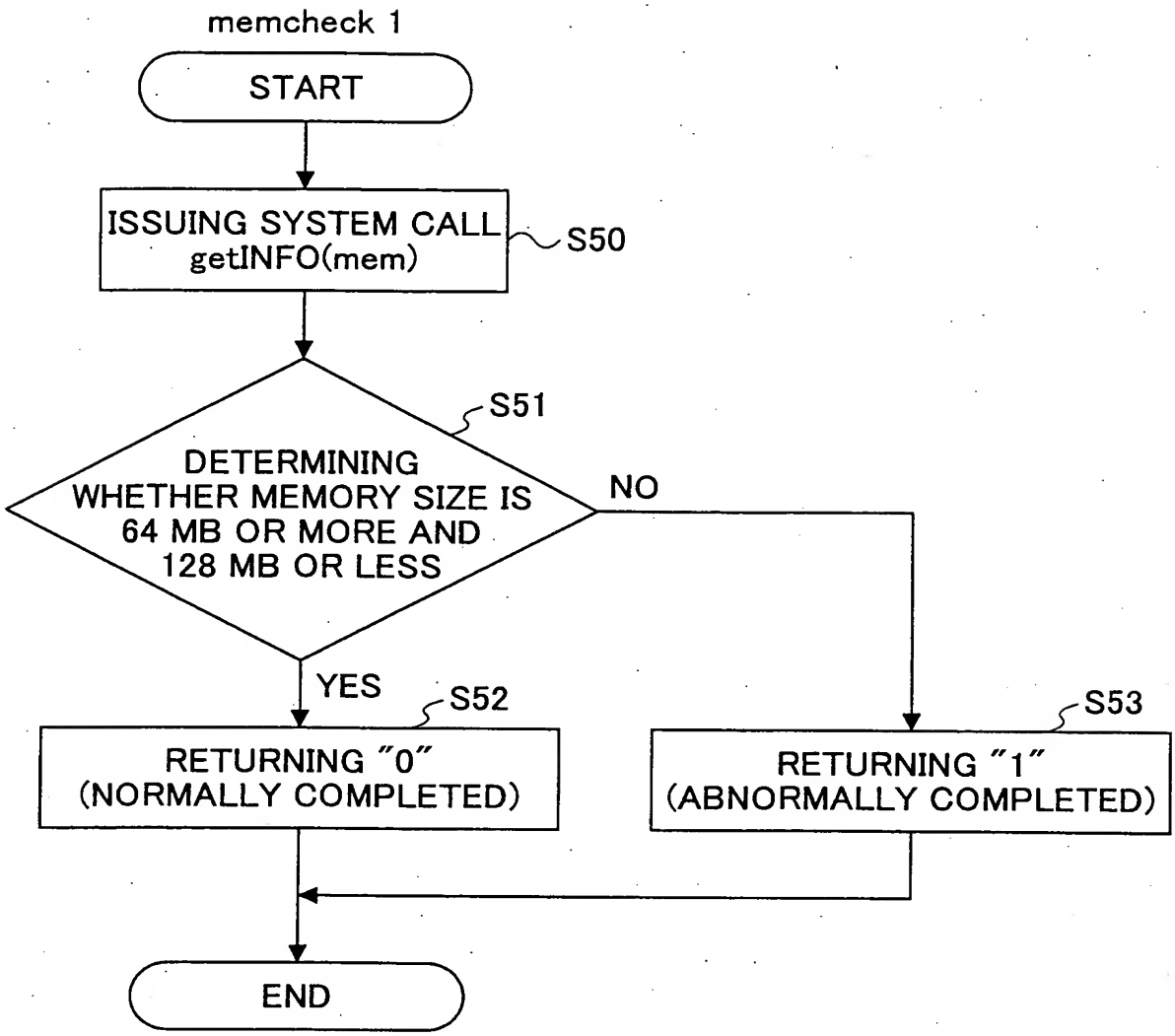

memcheck 1
START
ISSUING SYSTEM CALL
getINFO(mem)
S50
S51
DETERMINING
WHETHER MEMORY SIZE IS
64 MB OR MORE AND
128 MB OR LESS
NO
YES
S52
RETURNING "0"
(NORMALLY COMPLETED)
S53
RETURNING "1"
(ABNORMALLY COMPLETED)
END

FIG.11

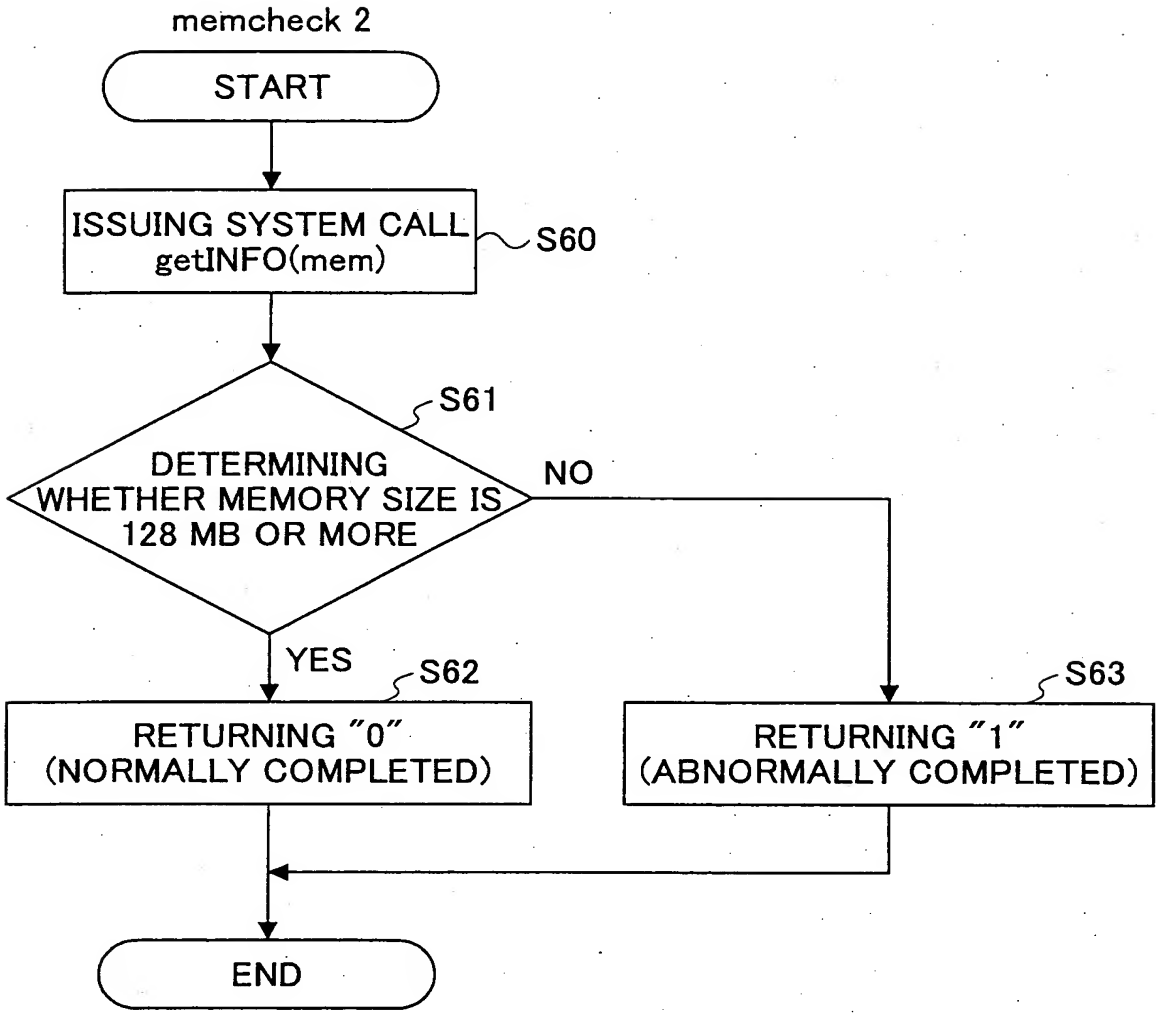

memcheck 2
START
ISSUING SYSTEM CALL
getINFO(mem)
S60
S61
DETERMINING
WHETHER MEMORY SIZE IS
128 MB OR MORE
NO
YES
S62
RETURNING "0"
(NORMALLY COMPLETED)
S63
RETURNING "1"
(ABNORMALLY COMPLETED)
END

FIG.12

```
mount -c /sbin/hddnonexist ramdisk /dev/md0c /ramdisk
```

FIG.13

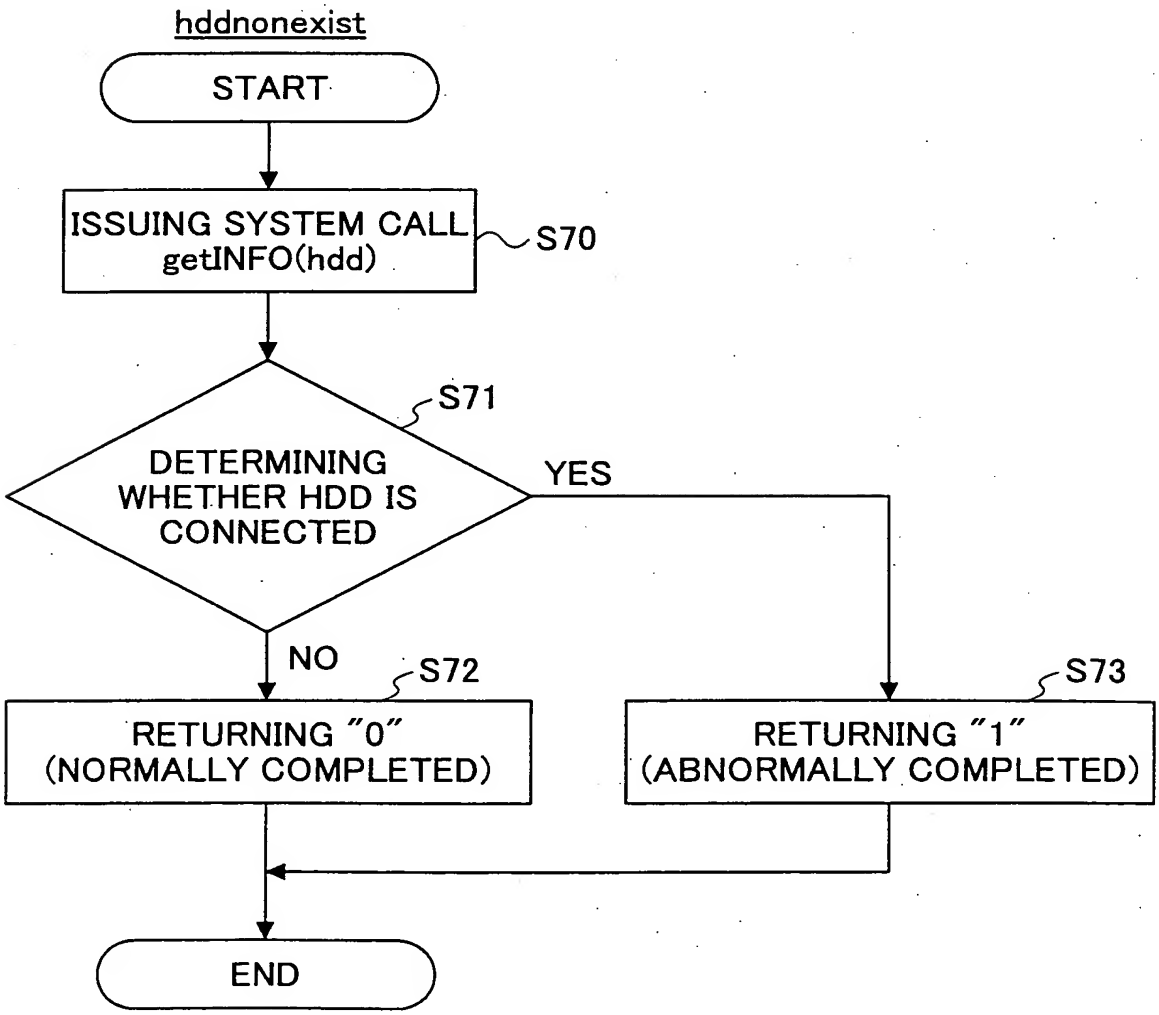


FIG.14

```
sd2
mount -c /sbin/sdcommand gzromfs abc.mod /mnt
exec /mnt/abc
```

FIG.15

```
abc.cnf
module/abc.mod
```

FIG.16

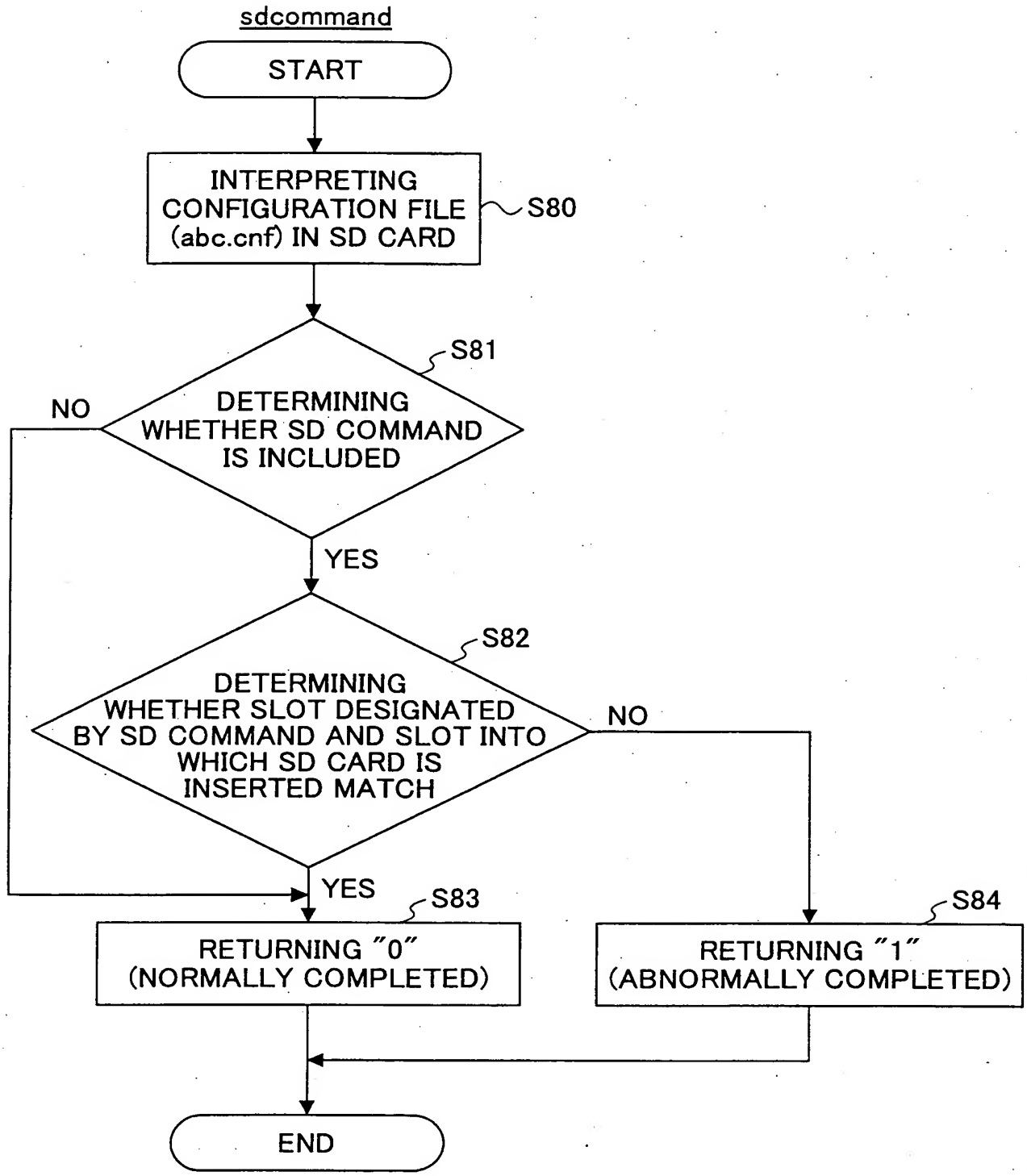

sdcommand
START
INTERPRETING CONFIGURATION FILE (abc.cnf) IN SD CARD
S80
S81
DETERMINING WHETHER SD COMMAND IS INCLUDED
NO
YES
S82
DETERMINING WHETHER SLOT DESIGNATED BY SD COMMAND AND SLOT INTO WHICH SD CARD IS INSERTED MATCH
NO
YES
S83
RETURNING "0" (NORMALLY COMPLETED)
S84
RETURNING "1" (ABNORMALLY COMPLETED)
END

FIG.17

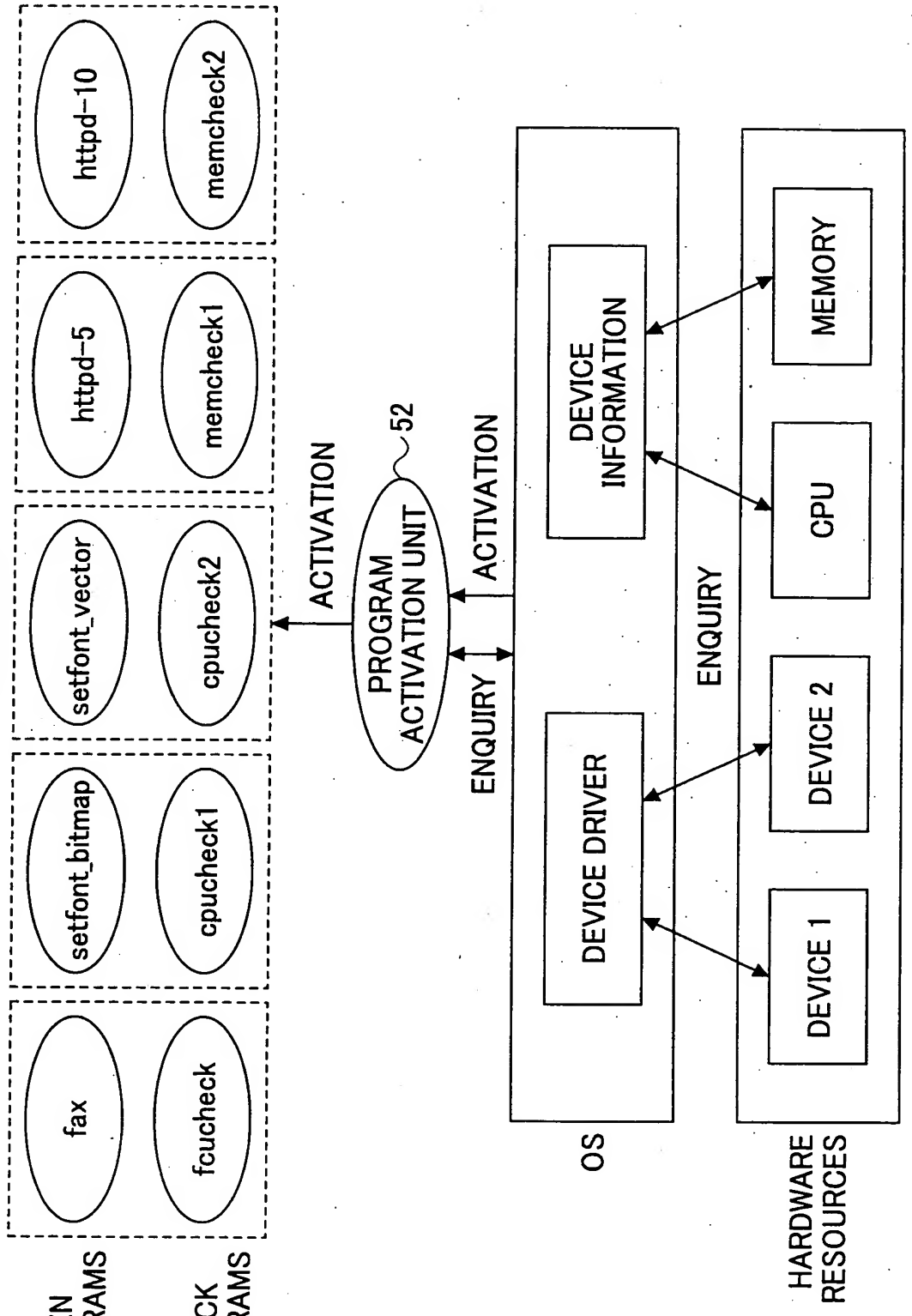

MAIN PROGRAMS
CHECK PROGRAMS
PROGRAMS
fax
fcucheck
setfont_bitmap
cpucheck1
setfont_vector
cpucheck2
httpd-5
memcheck1
httpd-10
memcheck2
ACTIVATION
PROGRAM ACTIVATION UNIT
52
ACTIVATION
ENQUIRY
OS
DEVICE DRIVER
DEVICE INFORMATION
ENQUIRY
HARDWARE RESOURCES
DEVICE 1
DEVICE 2
CPU
MEMORY

FIG.18

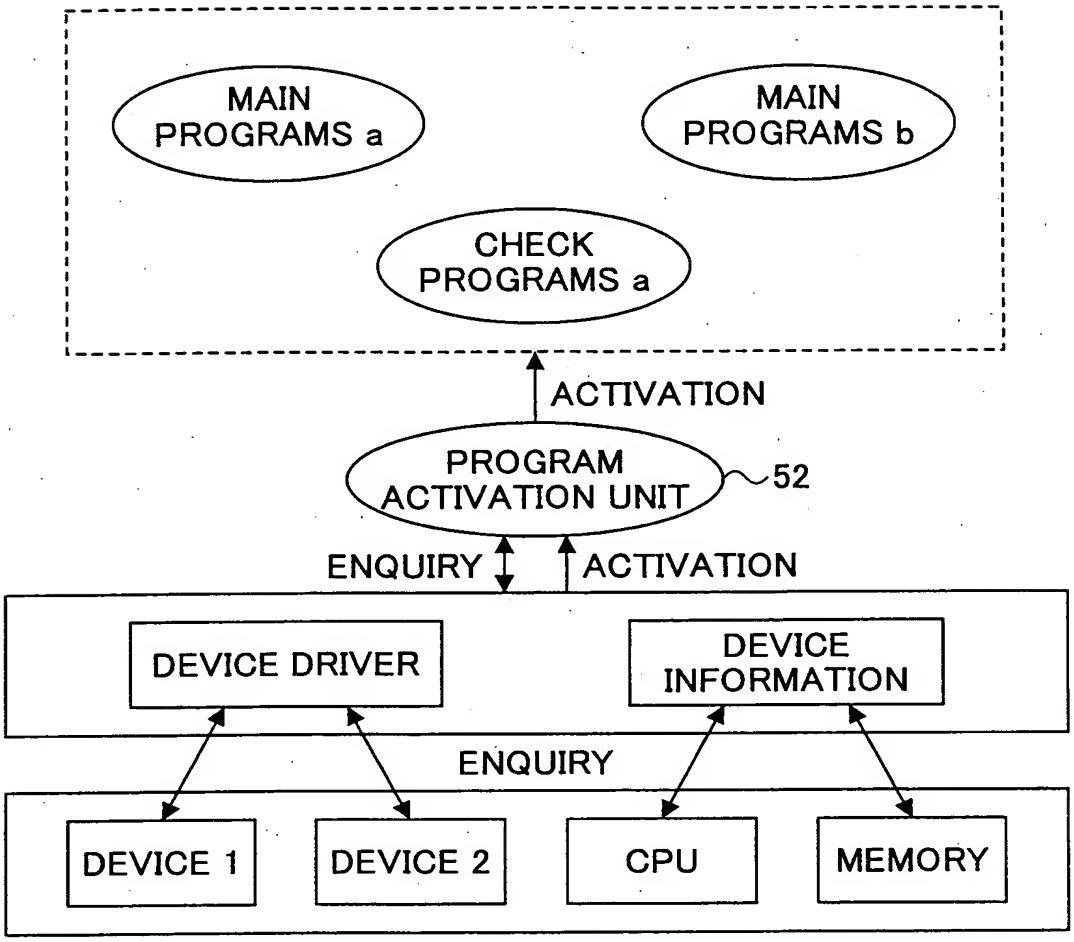

MAIN PROGRAMS a
MAIN PROGRAMS b
CHECK PROGRAMS a
ACTIVATION
PROGRAM ACTIVATION UNIT
52
ENQUIRY
ACTIVATION
DEVICE DRIVER
DEVICE INFORMATION
ENQUIRY
DEVICE 1
DEVICE 2
CPU
MEMORY

FIG.19

```
exec -c [CHECK PROGRAM a] [MAIN PROGRAM a]
exec -c [CHECK PROGRAM a] [MAIN PROGRAM b]
```

FIG.20

```
mount -c memcheck3 romfs web.romfs /web
```

FIG.21

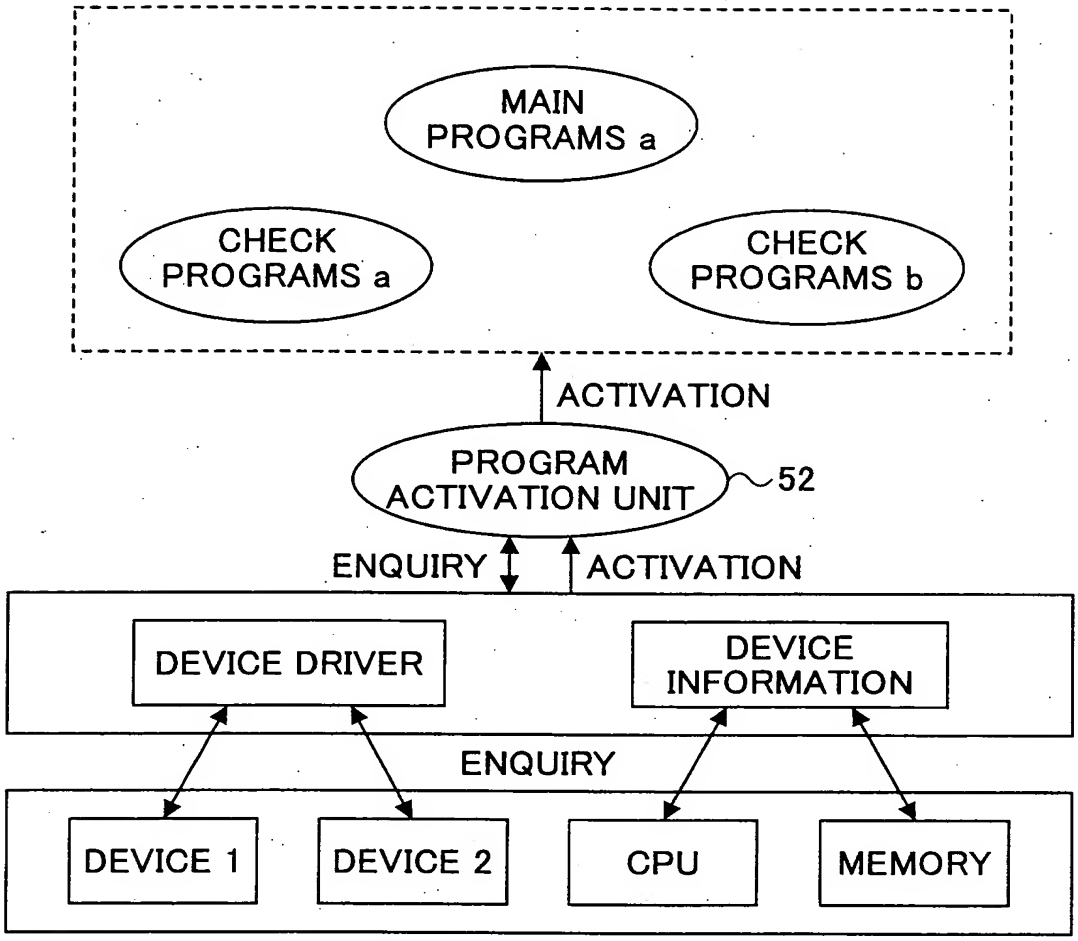


FIG.22

exec -c [CHECK PROGRAM a]-c [CHECK PROGRAM b] [MAIN PROGRAM a]

FIG.23

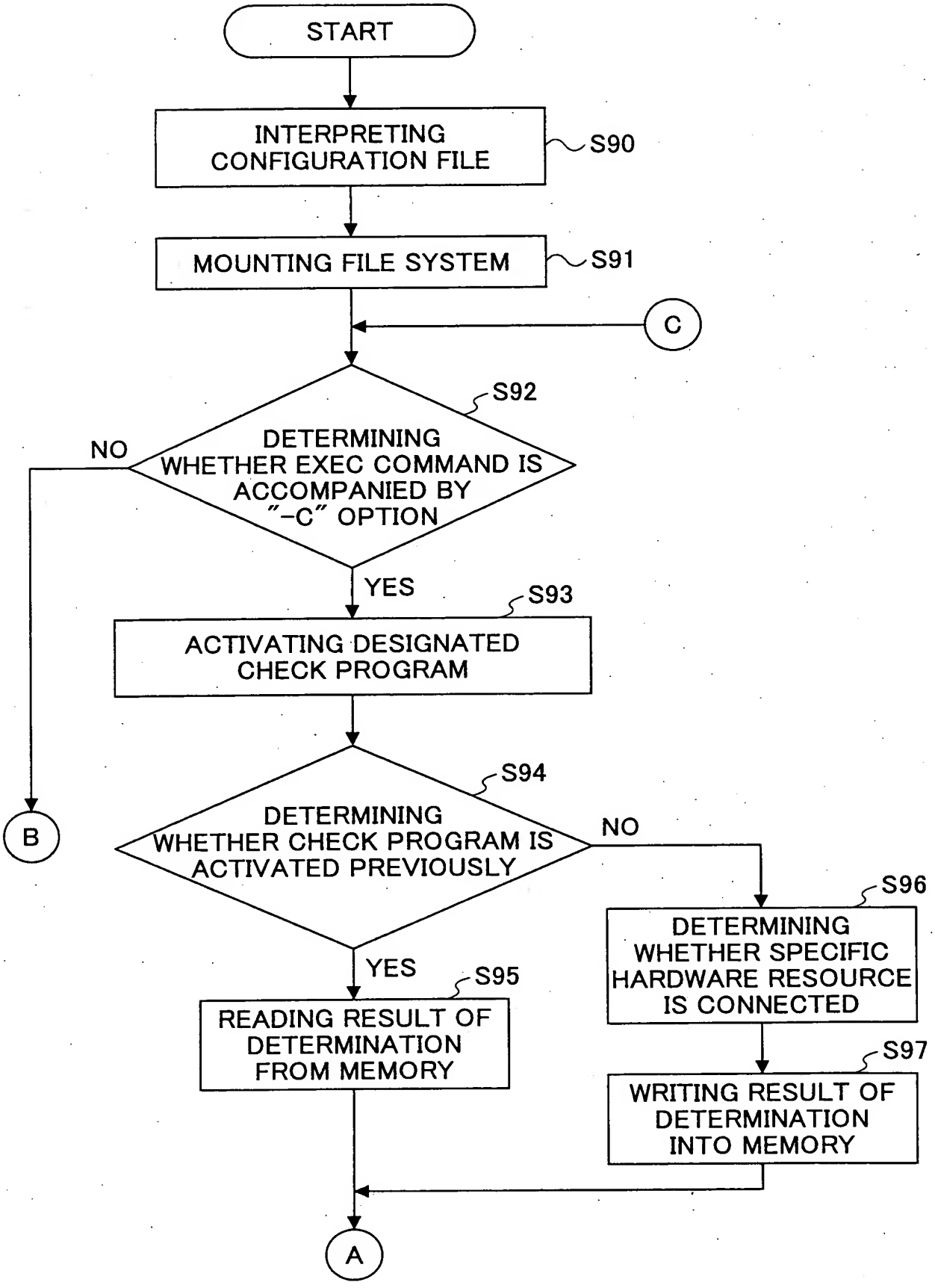

START
INTERPRETING CONFIGURATION FILE
S90
MOUNTING FILE SYSTEM
S91
C
S92
DETERMINING WHETHER EXEC COMMAND IS ACCOMPANIED BY "-C" OPTION
NO
YES
S93
ACTIVATING DESIGNATED CHECK PROGRAM
B
S94
DETERMINING WHETHER CHECK PROGRAM IS ACTIVATED PREVIOUSLY
NO
YES
S95
READING RESULT OF DETERMINATION FROM MEMORY
S96
DETERMINING WHETHER SPECIFIC HARDWARE RESOURCE IS CONNECTED
S97
WRITING RESULT OF DETERMINATION INTO MEMORY
A

FIG.24

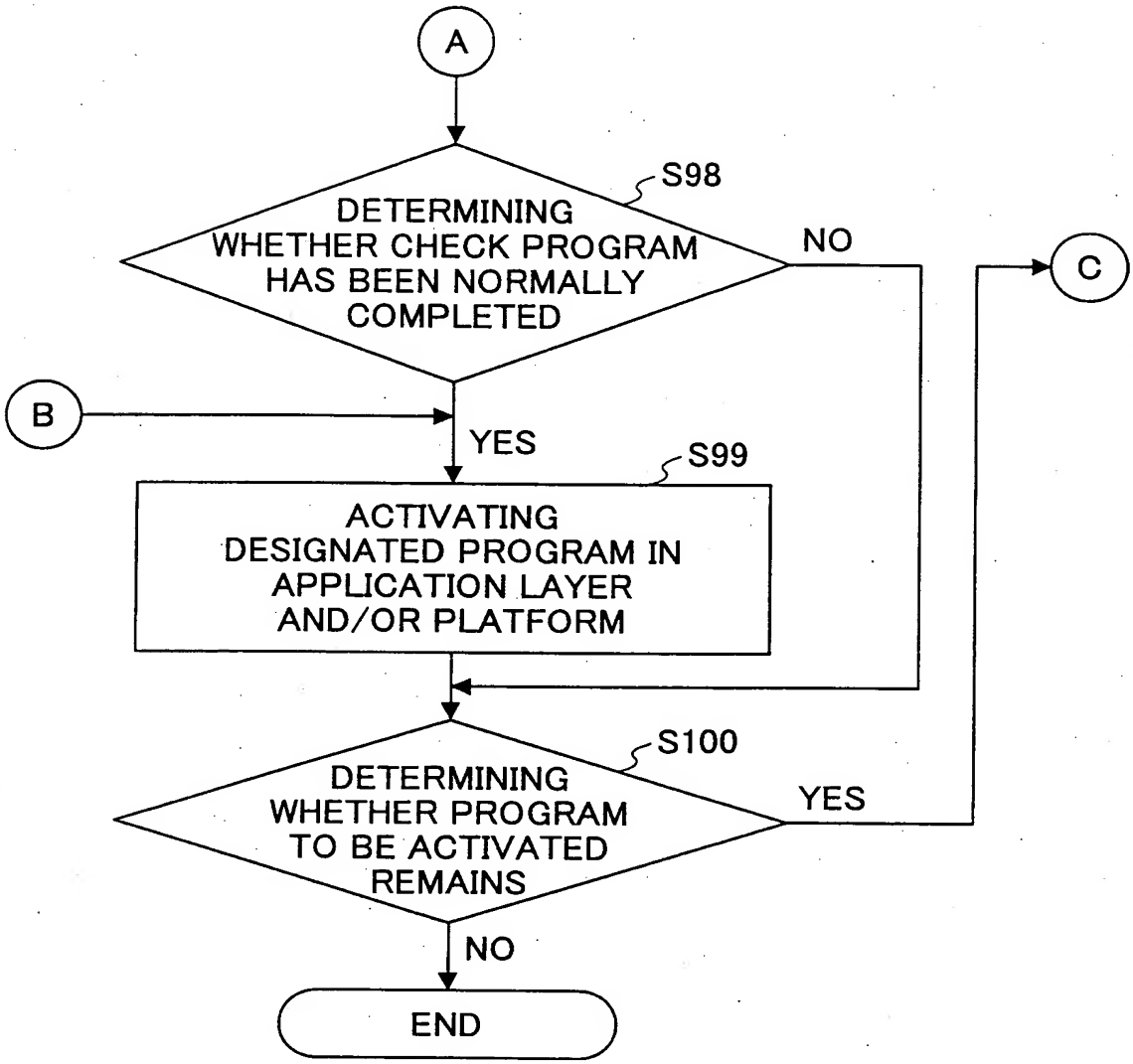

A
S98
DETERMINING WHETHER CHECK PROGRAM HAS BEEN NORMALLY COMPLETED
NO
C
B
YES
S99
ACTIVATING DESIGNATED PROGRAM IN APPLICATION LAYER AND/OR PLATFORM
S100
DETERMINING WHETHER PROGRAM TO BE ACTIVATED REMAINS
YES
NO
END

FIG.25

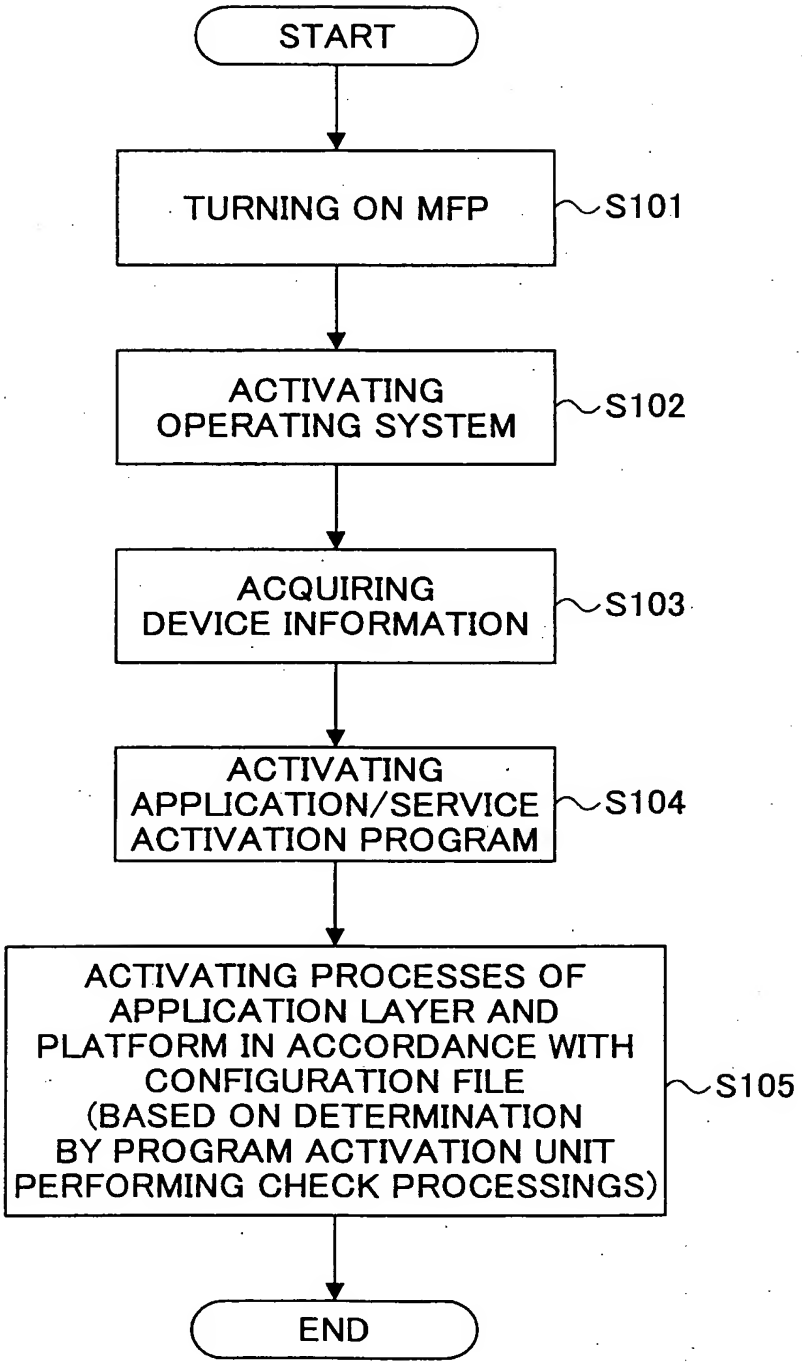

START
TURNING ON MFP
S101
ACTIVATING OPERATING SYSTEM
S102
ACQUIRING DEVICE INFORMATION
S103
ACTIVATING APPLICATION/SERVICE ACTIVATION PROGRAM
S104
ACTIVATING PROCESSES OF APPLICATION LAYER AND PLATFORM IN ACCORDANCE WITH CONFIGURATION FILE (BASED ON DETERMINATION BY PROGRAM ACTIVATION UNIT PERFORMING CHECK PROCESSINGS)
S105
END

FIG.26

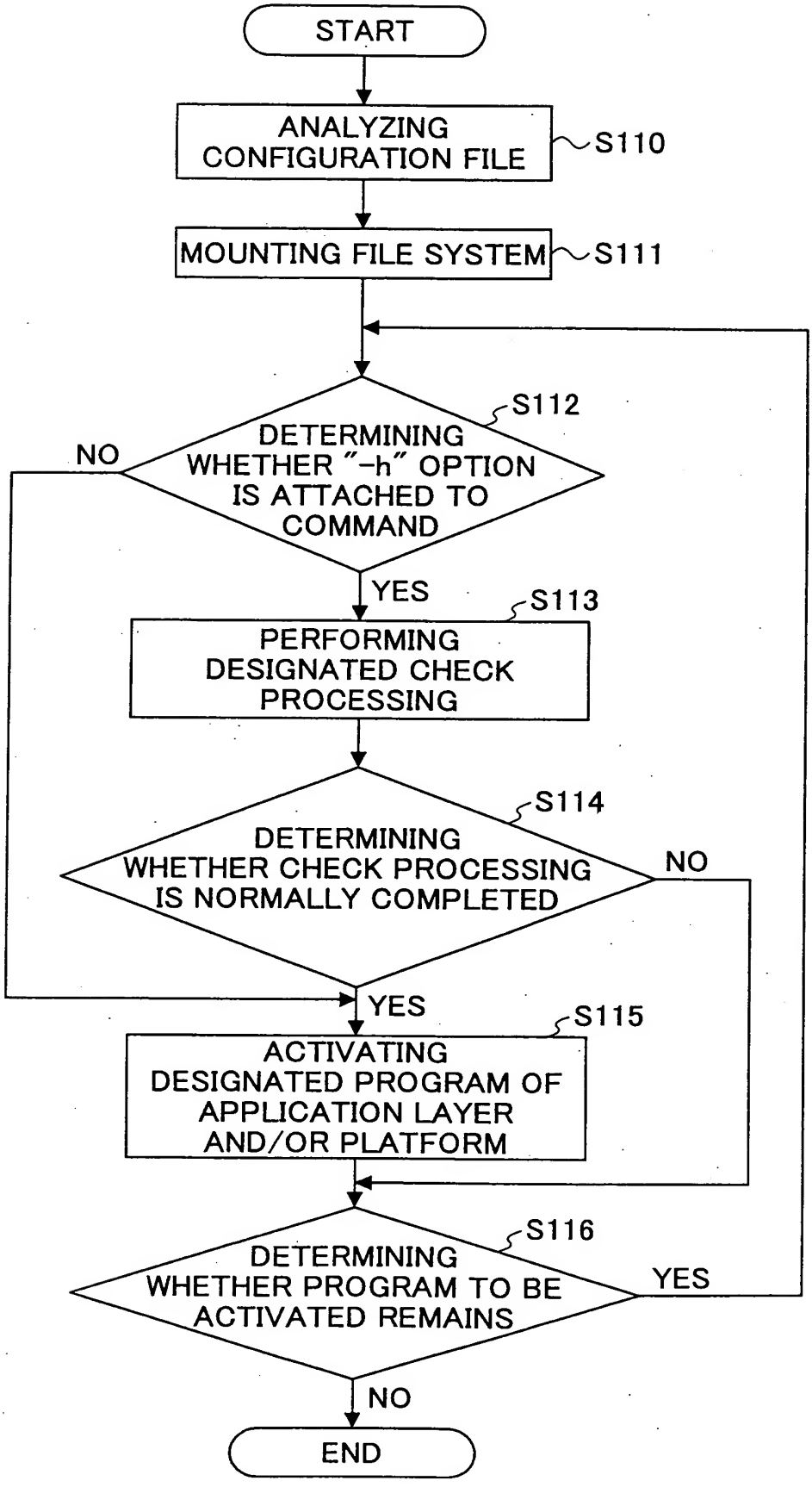

START
ANALYZING CONFIGURATION FILE
S110
MOUNTING FILE SYSTEM
S111
S112
DETERMINING WHETHER "-h" OPTION IS ATTACHED TO COMMAND
NO
YES
S113
PERFORMING DESIGNATED CHECK PROCESSING
S114
DETERMINING WHETHER CHECK PROCESSING IS NORMALLY COMPLETED
NO
YES
S115
ACTIVATING DESIGNATED PROGRAM OF APPLICATION LAYER AND/OR PLATFORM
S116
DETERMINING WHETHER PROGRAM TO BE ACTIVATED REMAINS
YES
NO
END

FIG.27

```
exec -h fcucheck /fax/bin/fax

exec -h cpucheck1 /printer/bin/setfont_bitmap
exec -h cpucheck2 /printer/bin/setfont_vector

exec -h memcheck1 /web/bin/httpd -5
exec -h memcheck2 /web/bin/httpd -10
```

FIG.28

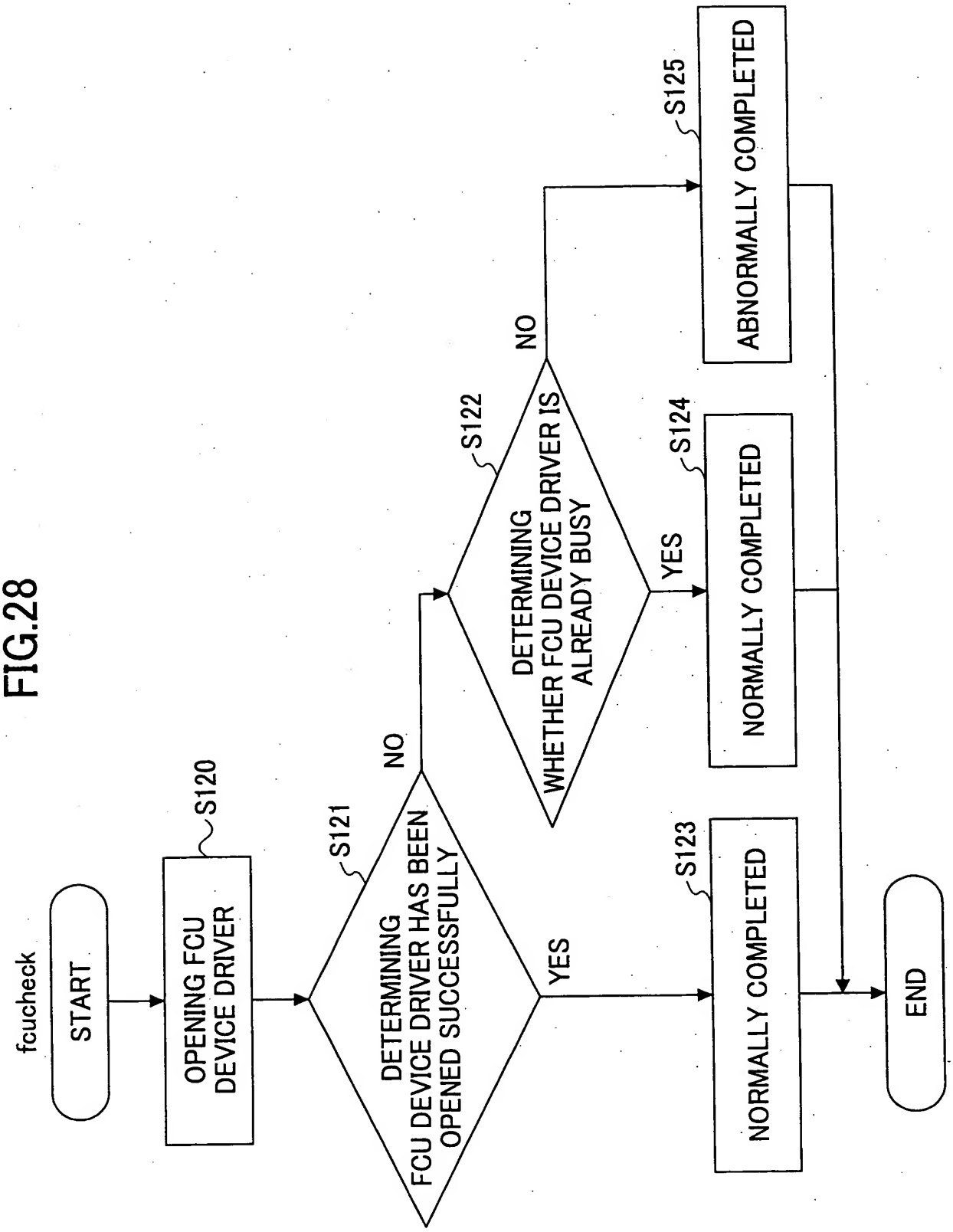

fcucheck
START
OPENING FCU DEVICE DRIVER
S120
DETERMINING FCU DEVICE DRIVER HAS BEEN OPENED SUCCESSFULLY
S121
NO
YES
DETERMINING WHETHER FCU DEVICE DRIVER IS ALREADY BUSY
S122
NO
YES
ABNORMALLY COMPLETED
S125
NORMALLY COMPLETED
S124
NORMALLY COMPLETED
S123
END

FIG.29

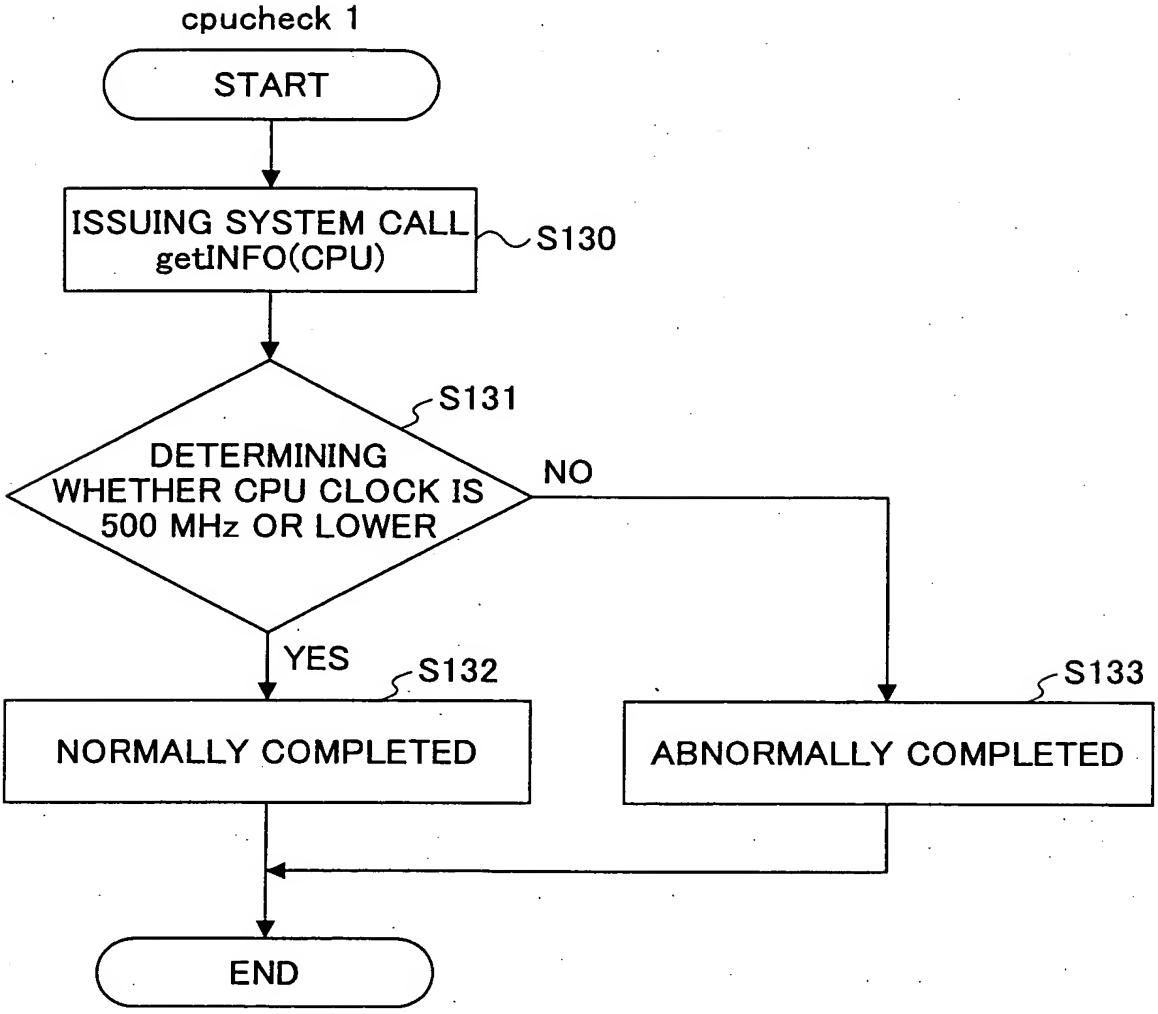

cpucheck 1
START
ISSUING SYSTEM CALL
getINFO(CPU)
S130
S131
DETERMINING
WHETHER CPU CLOCK IS
500 MHz OR LOWER
NO
YES
S132
S133
NORMALLY COMPLETED
ABNORMALLY COMPLETED
END

FIG.30

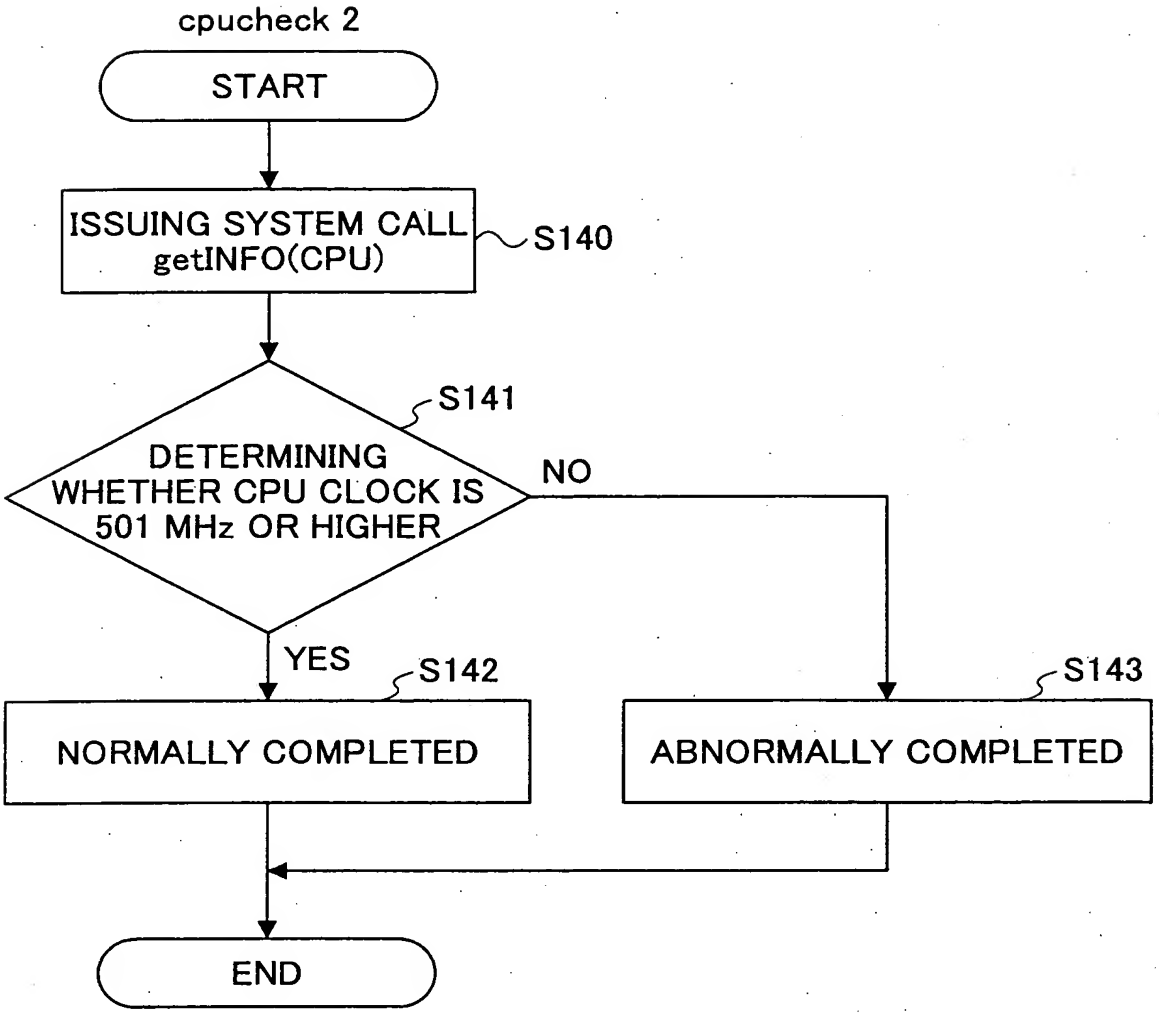

cpucheck 2
START
ISSUING SYSTEM CALL
getINFO(CPU)
S140
S141
DETERMINING
WHETHER CPU CLOCK IS
501 MHz OR HIGHER
NO
YES
S142
S143
NORMALLY COMPLETED
ABNORMALLY COMPLETED
END

FIG.31

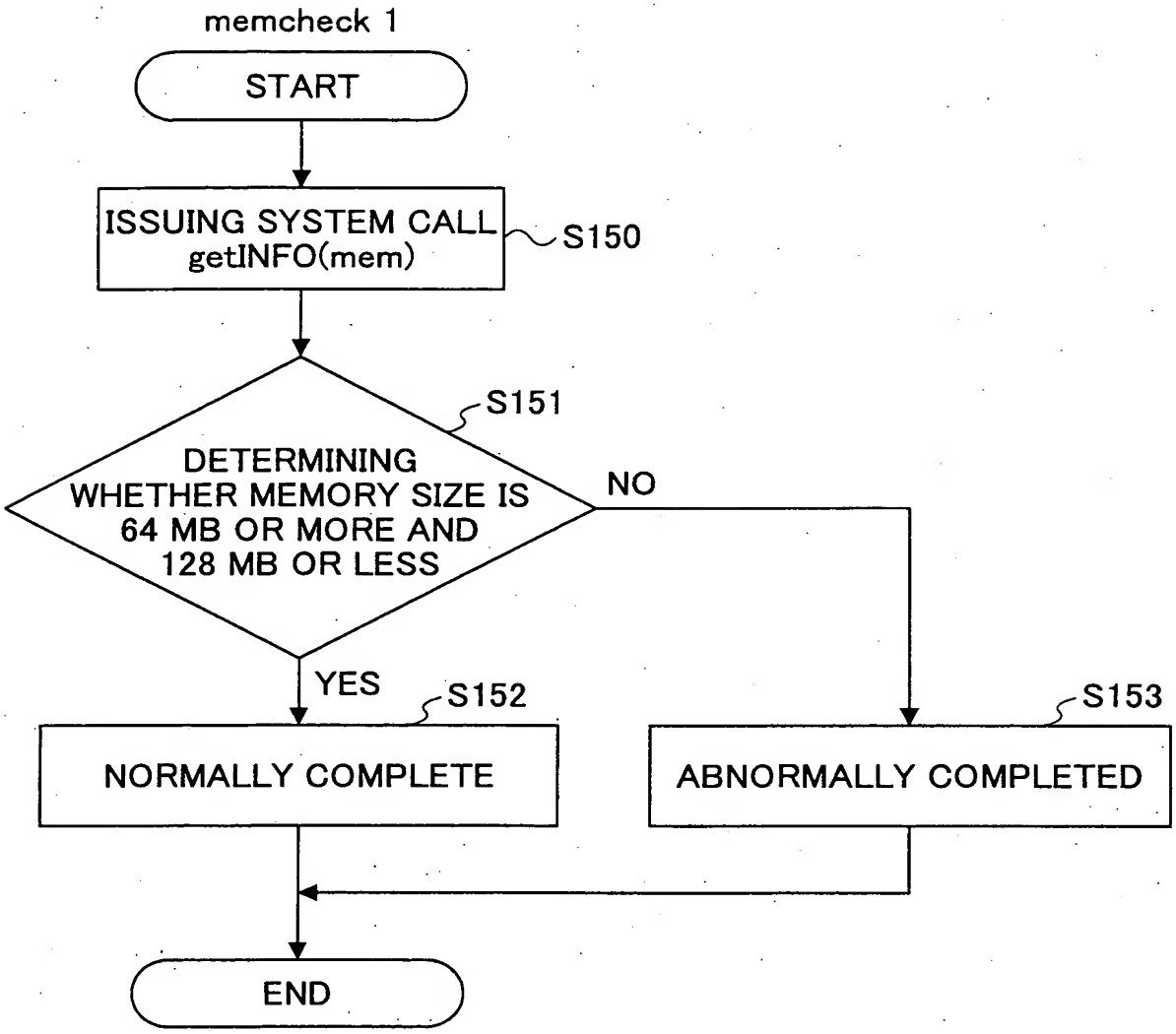

memcheck 1
START
ISSUING SYSTEM CALL
getINFO(mem)
S150
S151
DETERMINING
WHETHER MEMORY SIZE IS
64 MB OR MORE AND
128 MB OR LESS
NO
YES
S152
S153
NORMALLY COMPLETE
ABNORMALLY COMPLETED
END

FIG.32

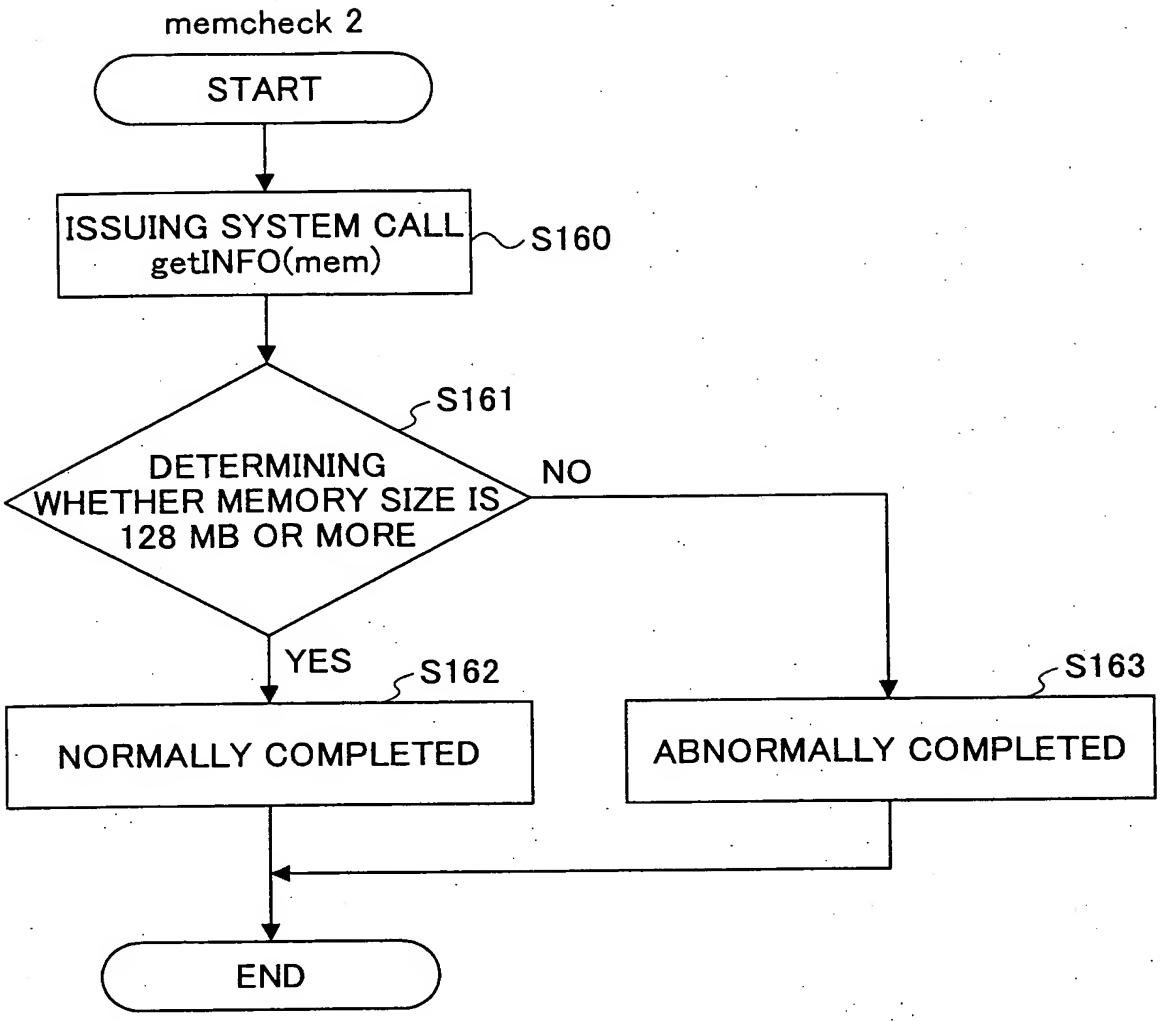

memcheck 2
START
ISSUING SYSTEM CALL
getINFO(mem)
S160
S161
DETERMINING
WHETHER MEMORY SIZE IS
128 MB OR MORE
NO
YES
S162
S163
NORMALLY COMPLETED
ABNORMALLY COMPLETED
END

FIG.33

```
mount -h hddnonexist ramdisk /dev/md0c /ramdisk
```

FIG.34

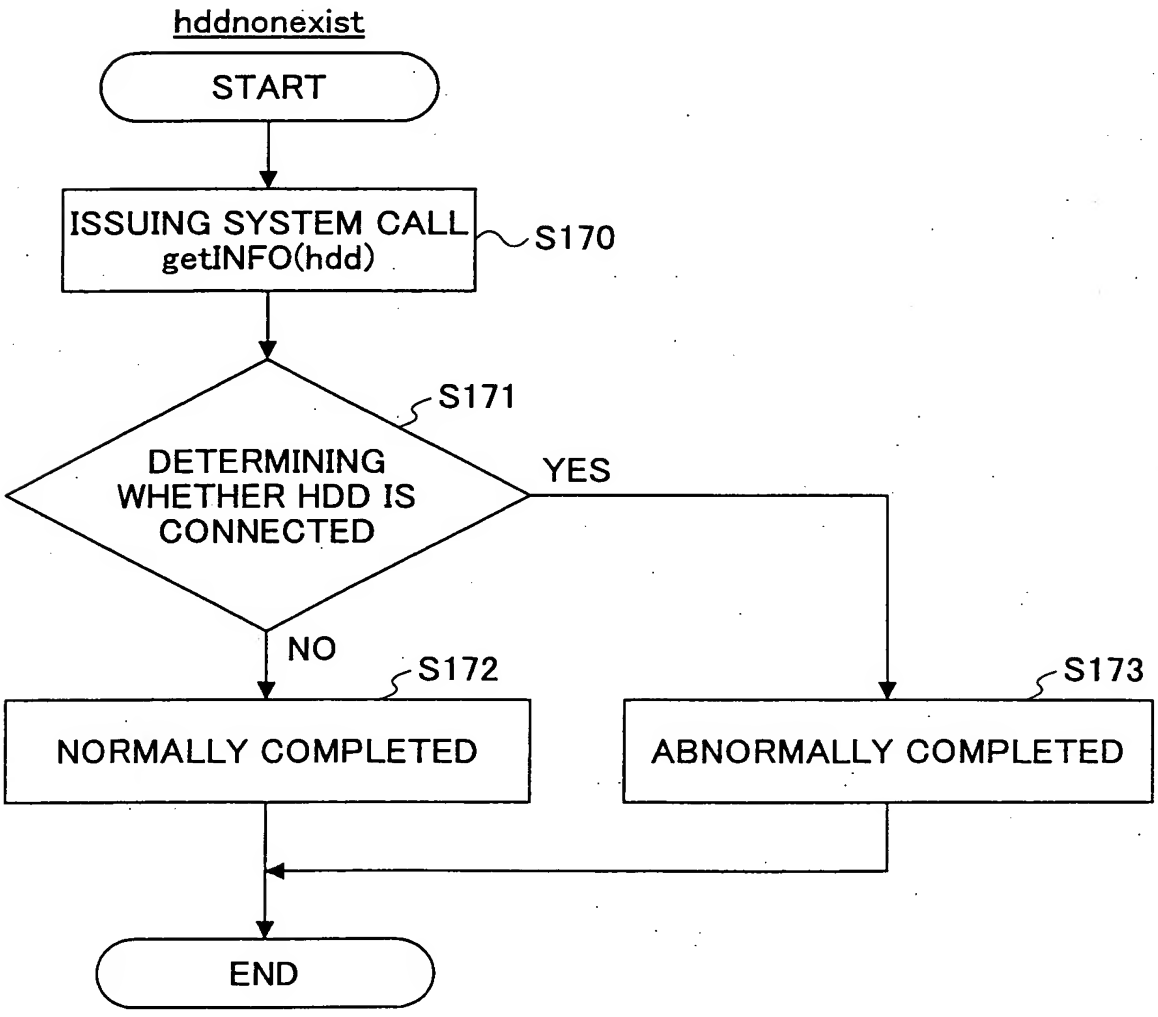


FIG.35

```
sd2
mount -h /sbin/sdcommand gzromfs abc.mod /mnt
exec /mnt/abc
```

FIG.36

```
abc.cnf
module/abc.mod
```

FIG.37

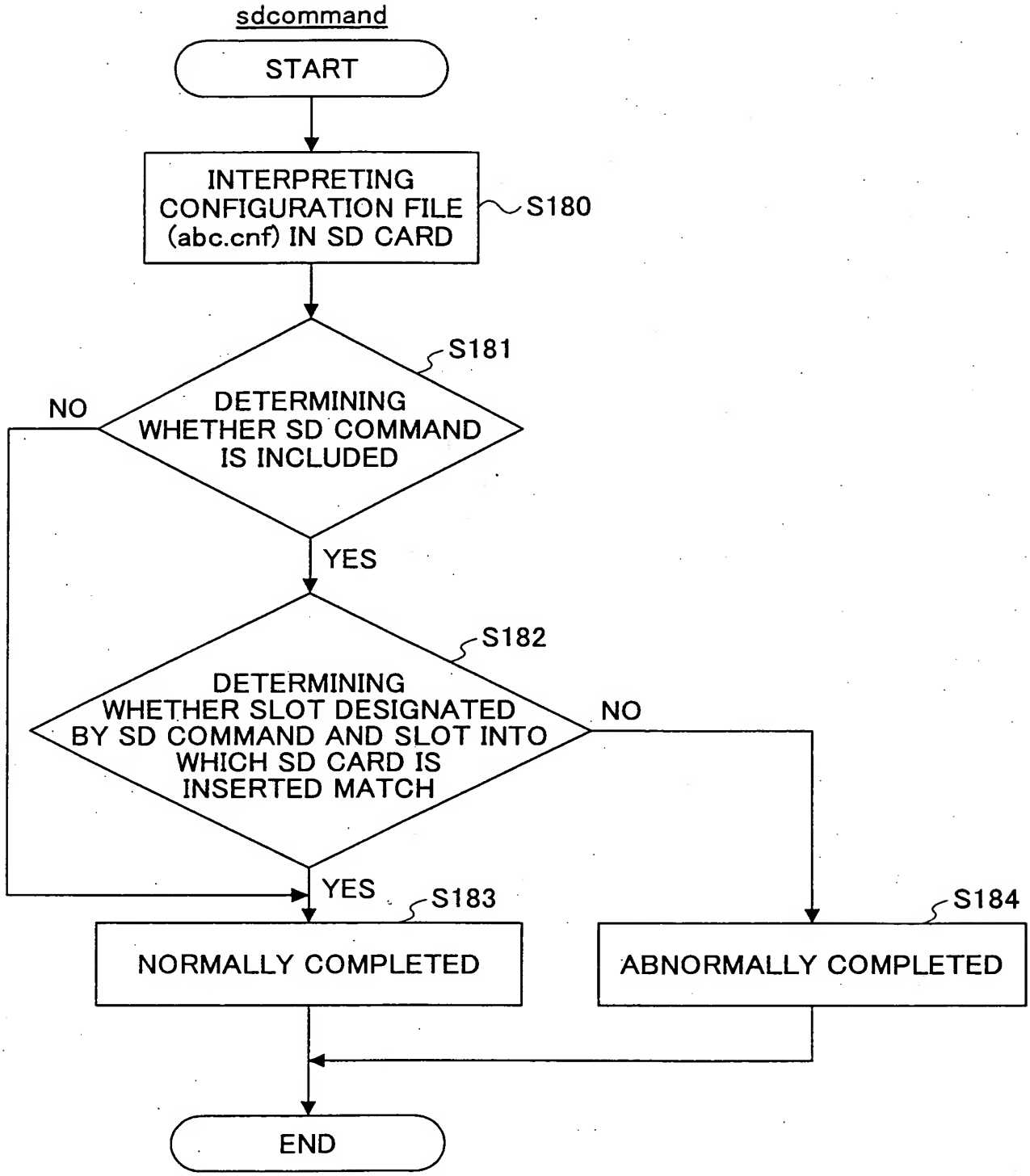

sdcommand
START
INTERPRETING CONFIGURATION FILE (abc.cnf) IN SD CARD
S180
S181
DETERMINING WHETHER SD COMMAND IS INCLUDED
NO
YES
S182
DETERMINING WHETHER SLOT DESIGNATED BY SD COMMAND AND SLOT INTO WHICH SD CARD IS INSERTED MATCH
NO
YES
S183
NORMALLY COMPLETED
S184
ABNORMALLY COMPLETED
END

FIG.38

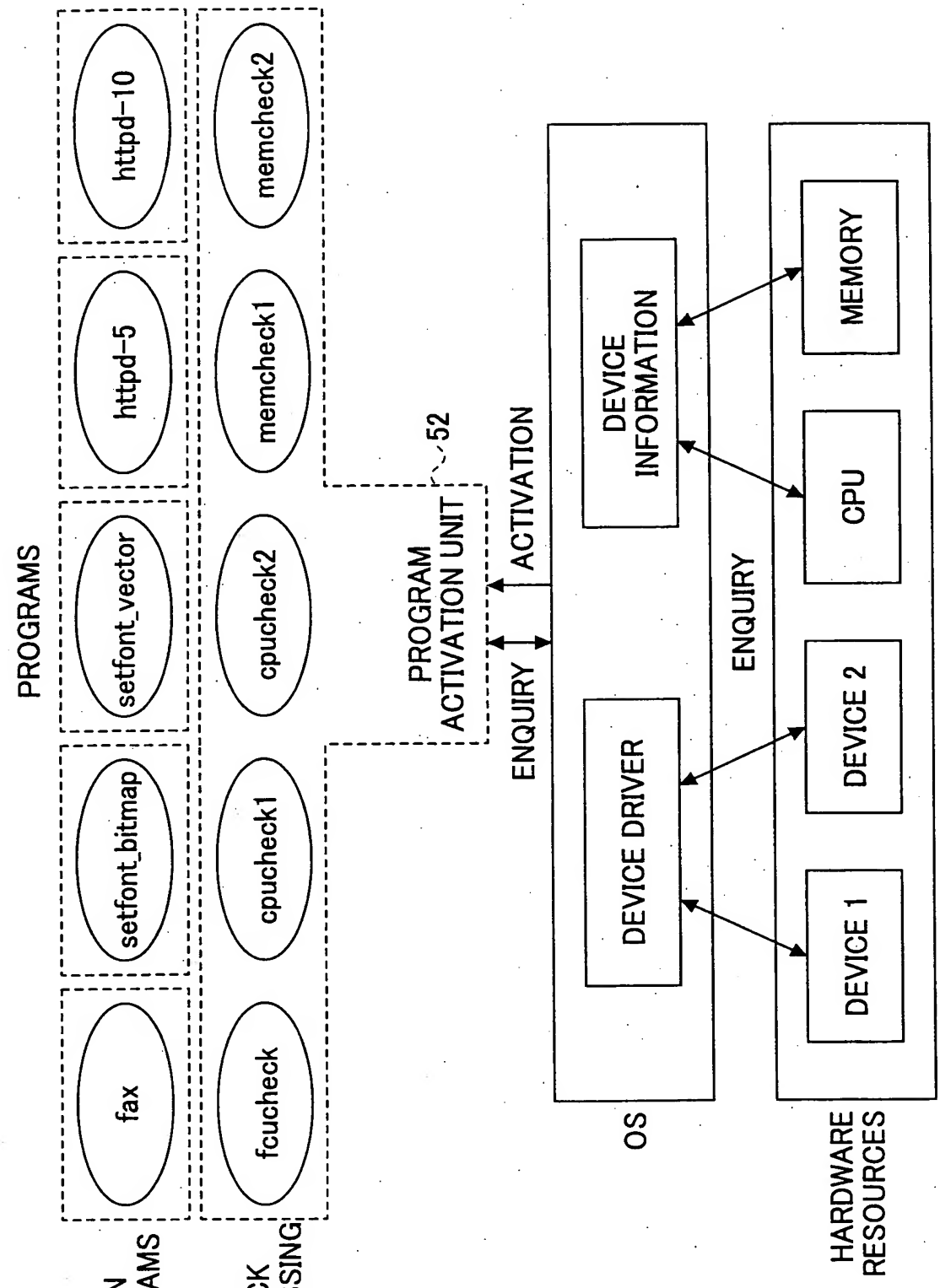

MAIN PROGRAMS
CHECK PROCESSING
PROGRAMS
fax
setfont_bitmap
setfont_vector
httpd-5
httpd-10
fcucheck
cpucheck1
cpucheck2
memcheck1
memcheck2
52
PROGRAM ACTIVATION UNIT
ACTIVATION
ENQUIRY
OS
DEVICE DRIVER
DEVICE INFORMATION
ENQUIRY
HARDWARE RESOURCES
DEVICE 1
DEVICE 2
CPU
MEMORY

FIG.39

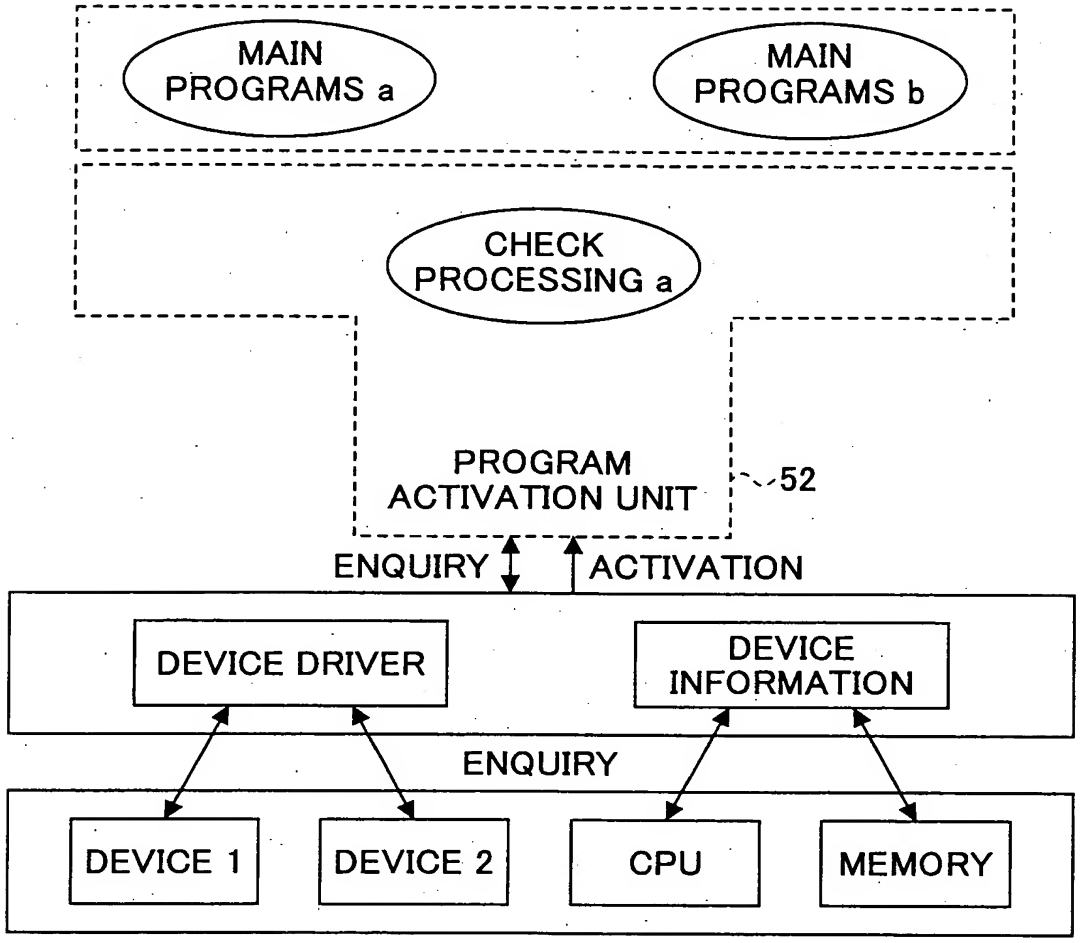

MAIN PROGRAMS a
MAIN PROGRAMS b
CHECK PROCESSING a
PROGRAM ACTIVATION UNIT
52
ENQUIRY
ACTIVATION
DEVICE DRIVER
DEVICE INFORMATION
ENQUIRY
DEVICE 1
DEVICE 2
CPU
MEMORY

FIG.40

```
exec -h [CHECK PROCESSING a] [MAIN PROGRAM a]
exec -h [CHECK PROCESSING a] [MAIN PROGRAM b]
```

FIG.41

```
mount -h memcheck3 romfs web.romfs /web
```

FIG.42

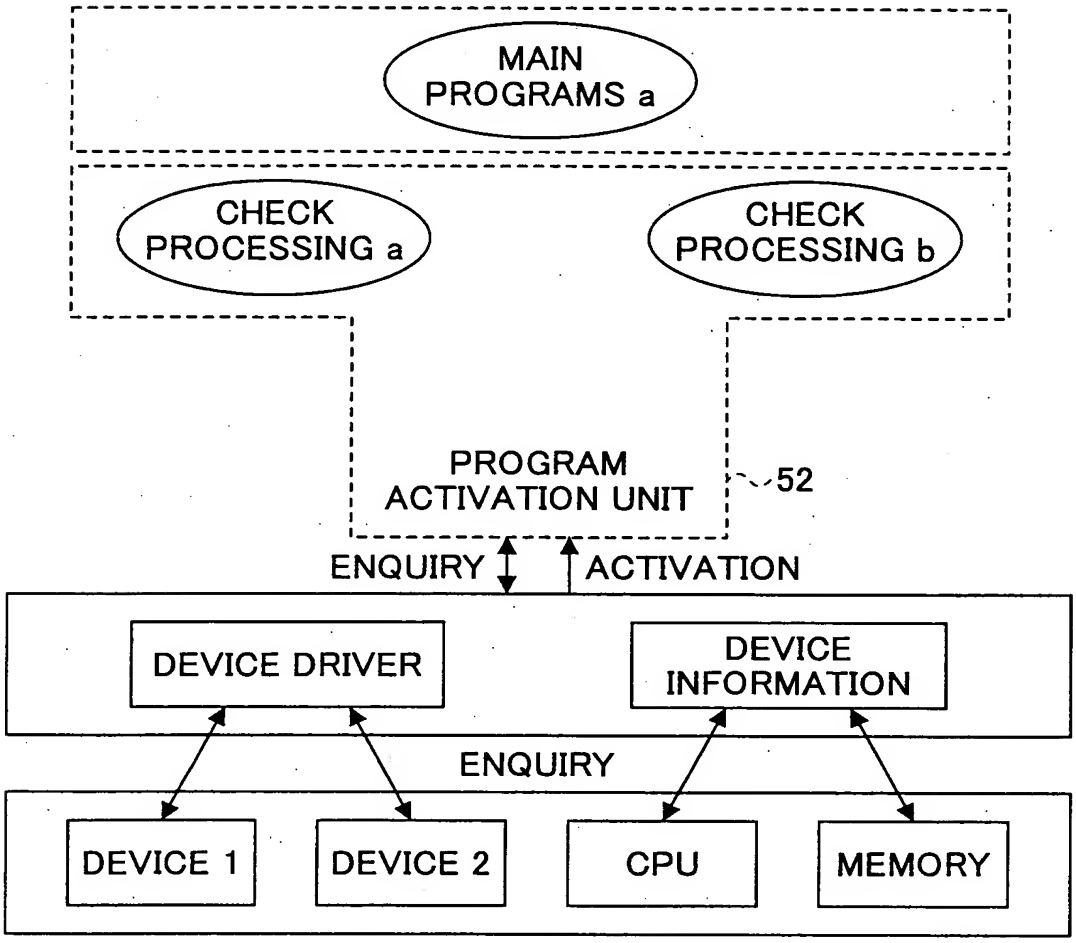


FIG.43

exec -h [CHECK PROCESSING a] -h [CHECK PROCESSING b] [MAIN PROGRAM a]

FIG.44

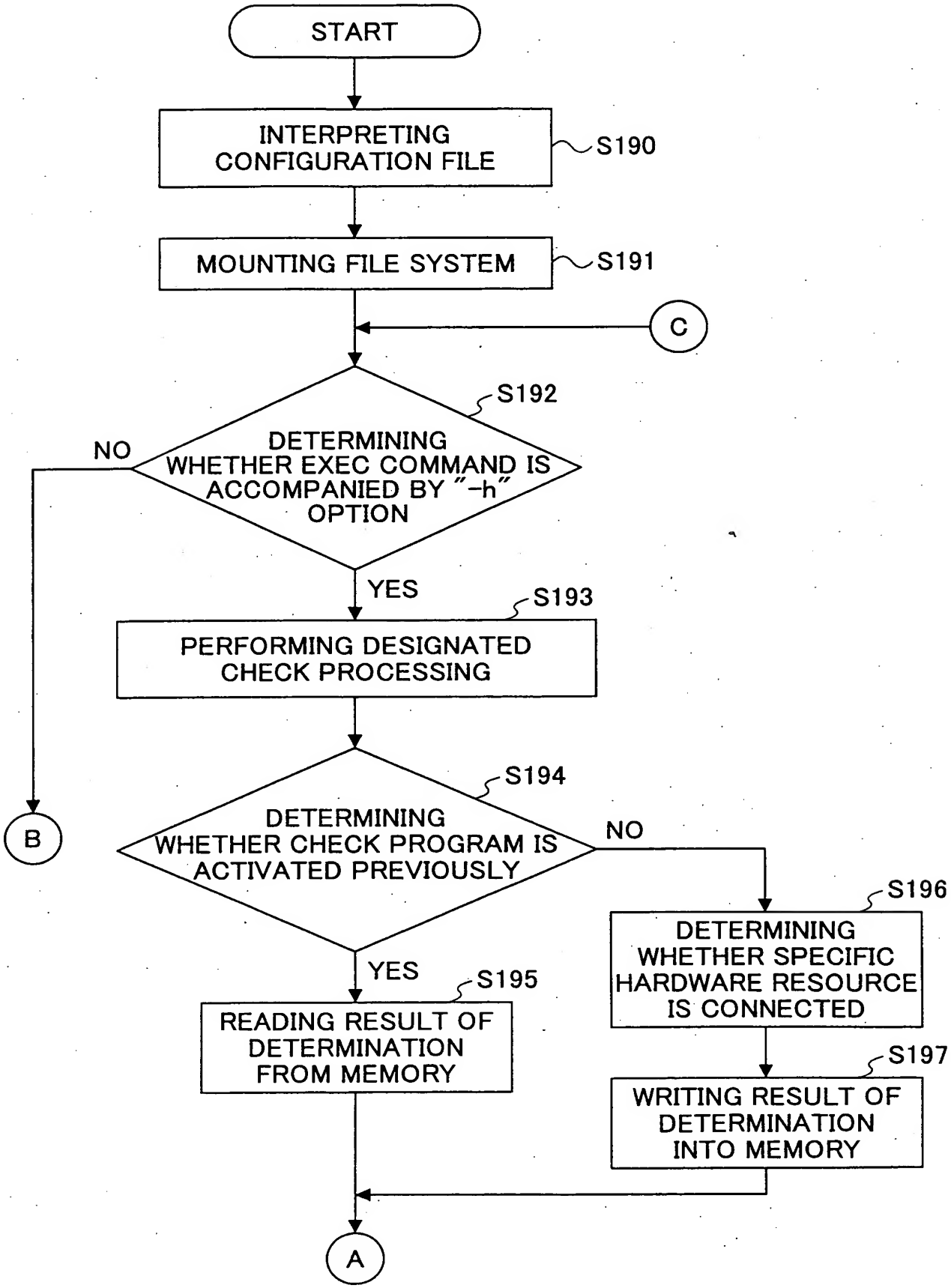

START
INTERPRETING CONFIGURATION FILE
S190
MOUNTING FILE SYSTEM
S191
C
S192
DETERMINING WHETHER EXEC COMMAND IS ACCOMPANIED BY "-h" OPTION
NO
YES
S193
PERFORMING DESIGNATED CHECK PROCESSING
S194
DETERMINING WHETHER CHECK PROGRAM IS ACTIVATED PREVIOUSLY
NO
YES
B
S195
READING RESULT OF DETERMINATION FROM MEMORY
S196
DETERMINING WHETHER SPECIFIC HARDWARE RESOURCE IS CONNECTED
S197
WRITING RESULT OF DETERMINATION INTO MEMORY
A

FIG.45

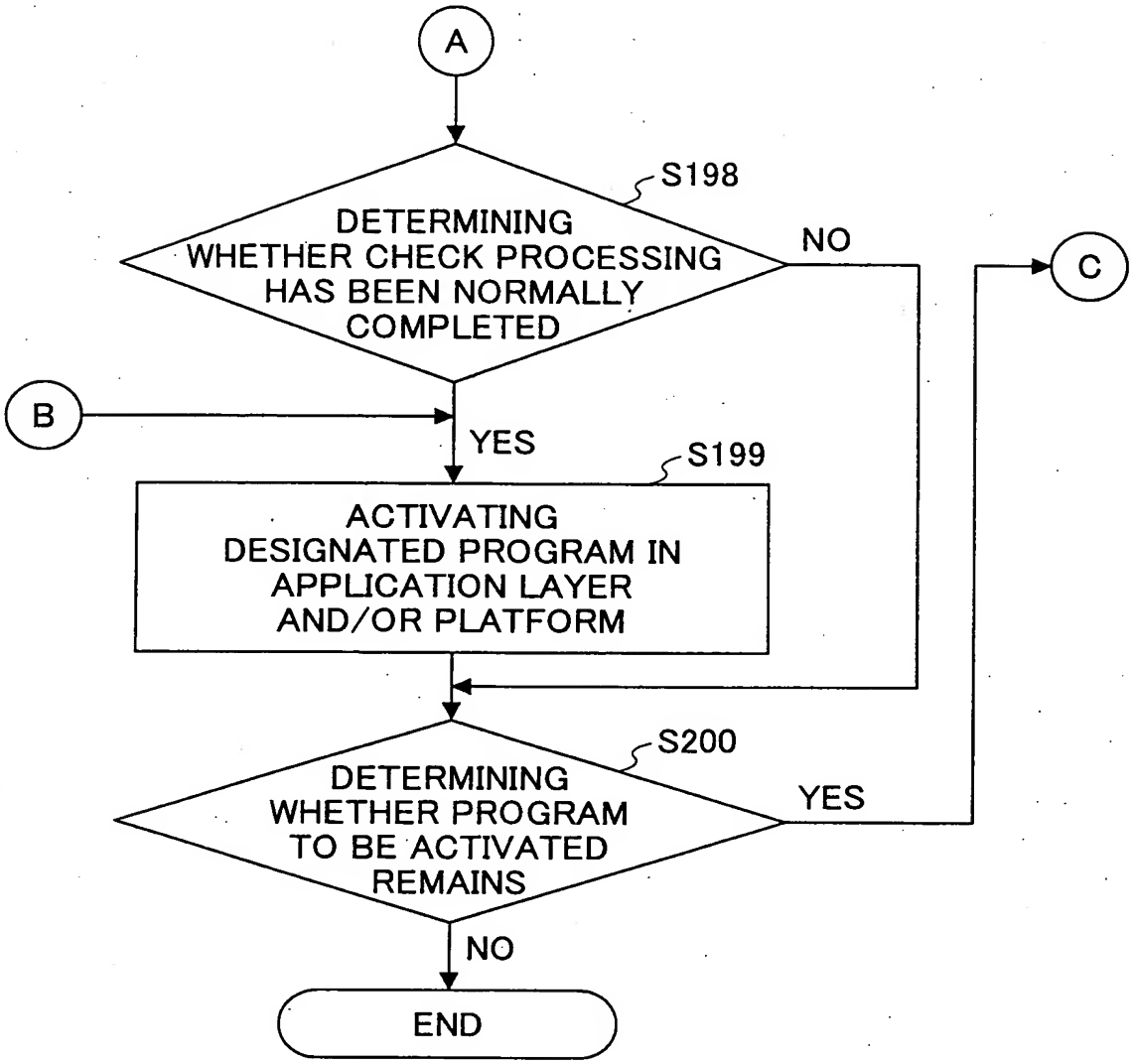

A
S198
DETERMINING WHETHER CHECK PROCESSING HAS BEEN NORMALLY COMPLETED
NO
C
B
YES
S199
ACTIVATING DESIGNATED PROGRAM IN APPLICATION LAYER AND/OR PLATFORM
S200
DETERMINING WHETHER PROGRAM TO BE ACTIVATED REMAINS
YES
NO
END

FIG.46

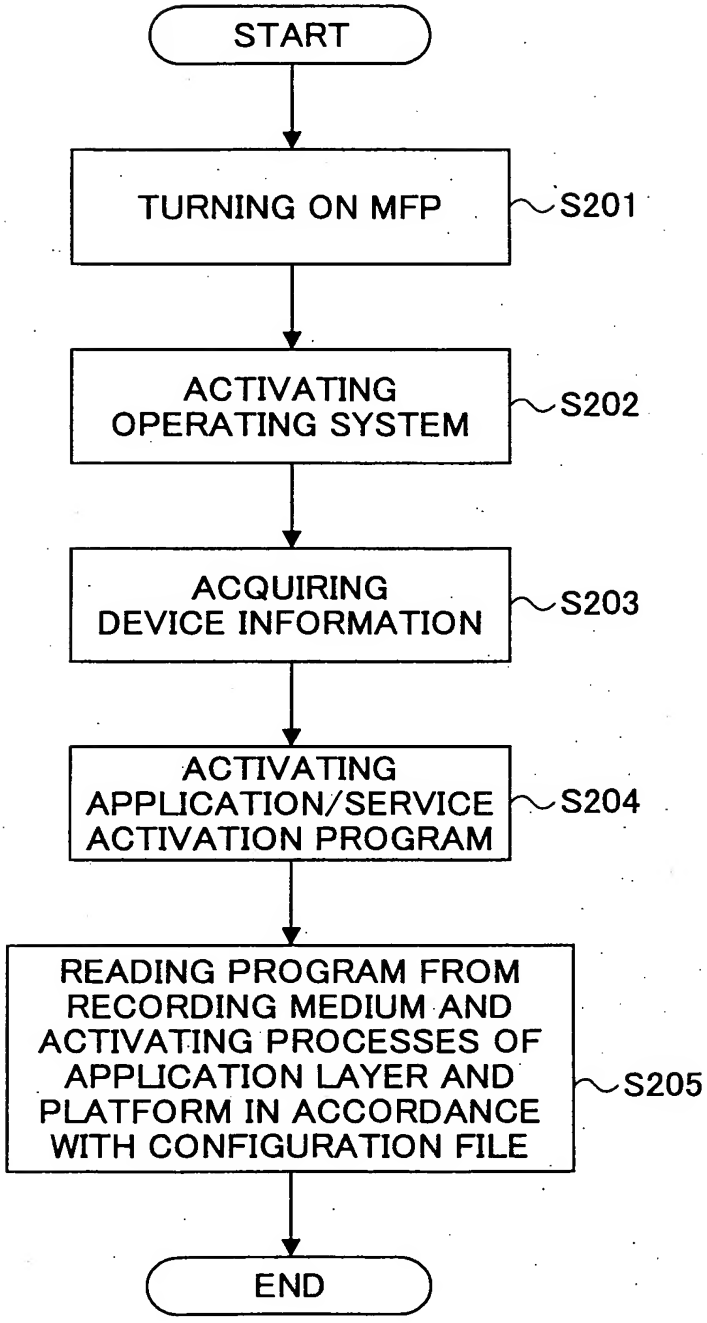

START
TURNING ON MFP
S201
ACTIVATING OPERATING SYSTEM
S202
ACQUIRING DEVICE INFORMATION
S203
ACTIVATING APPLICATION/SERVICE ACTIVATION PROGRAM
S204
READING PROGRAM FROM RECORDING MEDIUM AND ACTIVATING PROCESSES OF APPLICATION LAYER AND PLATFORM IN ACCORDANCE WITH CONFIGURATION FILE
S205
END

FIG.47

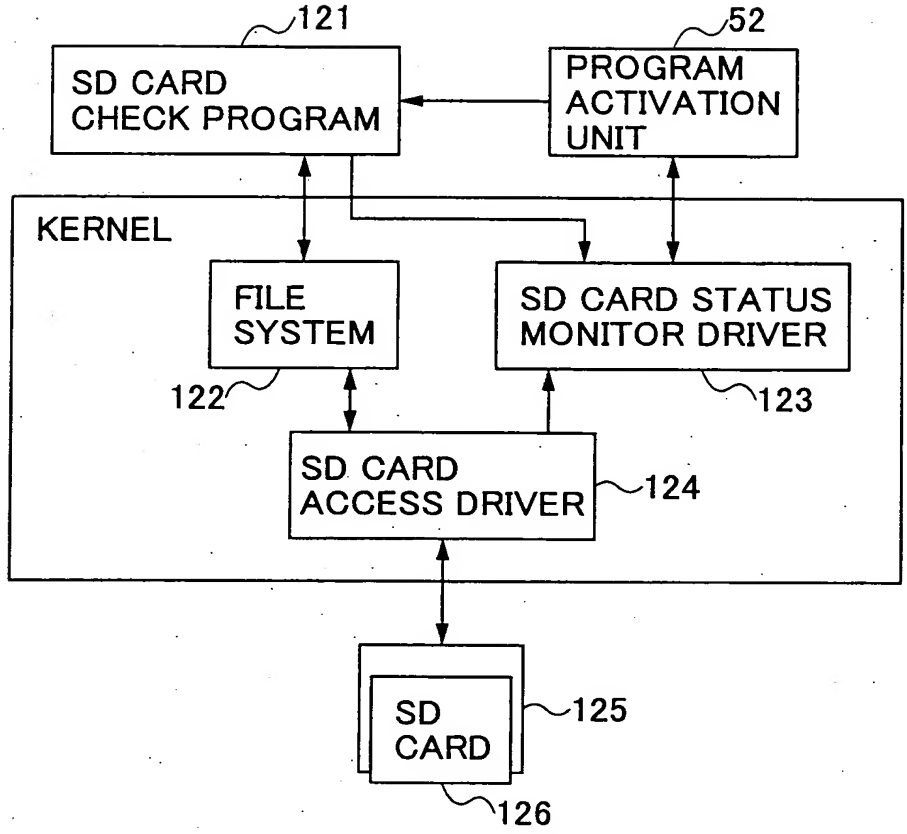

121
SD CARD CHECK PROGRAM
52
PROGRAM ACTIVATION UNIT
KERNEL
FILE SYSTEM
122
SD CARD STATUS MONITOR DRIVER
123
SD CARD ACCESS DRIVER
124
SD CARD
125
126

FIG.48

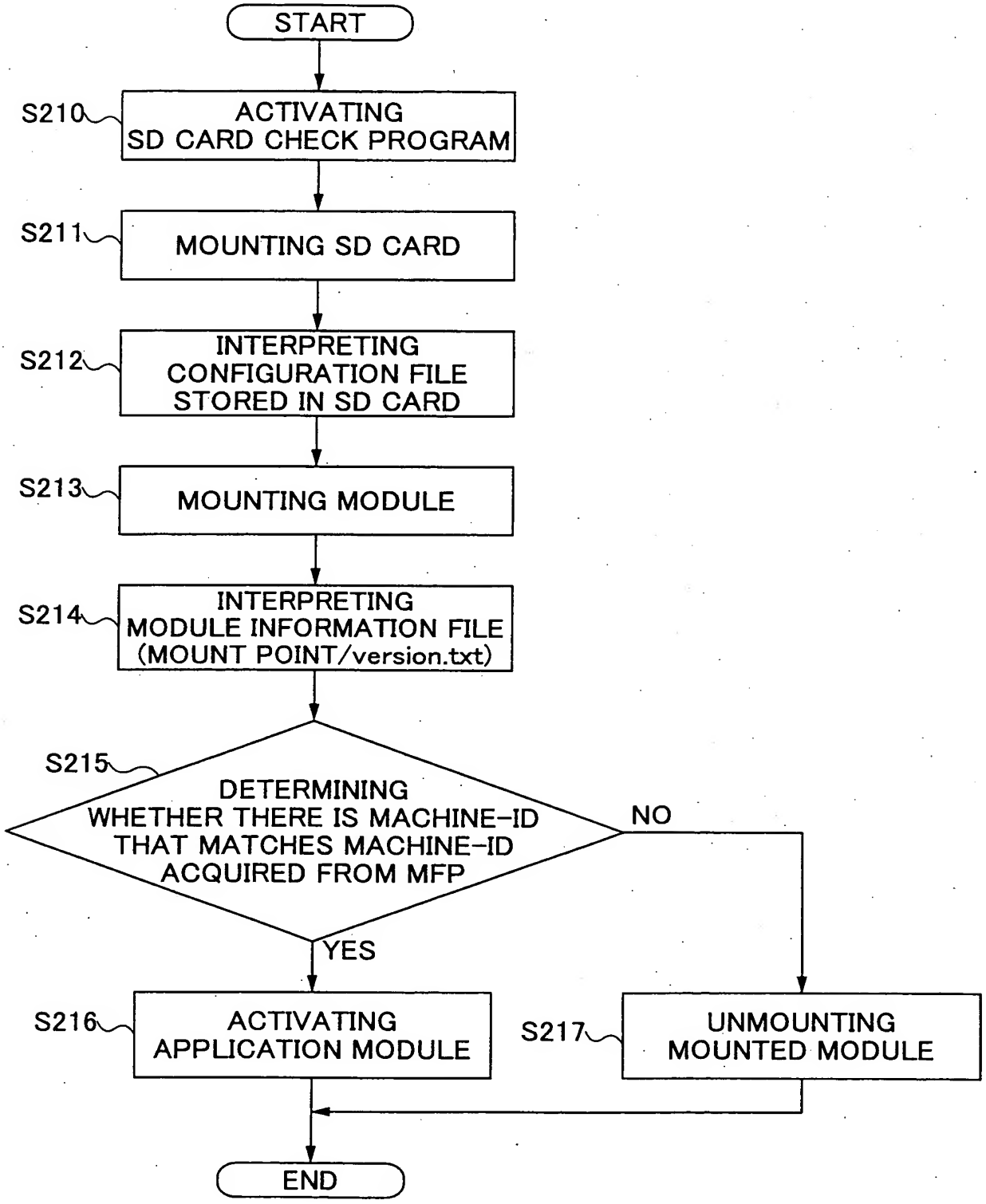

START
S210
ACTIVATING SD CARD CHECK PROGRAM
S211
MOUNTING SD CARD
S212
INTERPRETING CONFIGURATION FILE STORED IN SD CARD
S213
MOUNTING MODULE
S214
INTERPRETING MODULE INFORMATION FILE (MOUNT POINT/version.txt)
S215
DETERMINING WHETHER THERE IS MACHINE-ID THAT MATCHES MACHINE-ID ACQUIRED FROM MFP
NO
YES
S216
ACTIVATING APPLICATION MODULE
S217
UNMOUNTING MOUNTED MODULE
END

FIG.49

```
mount gzromfs printer.mod /arch/printer
exec /arch/printer/printer

mount gzromfs scanner.mod /arch/scanner
exec /arch/scanner/scanner

mount gzromfs factory.mod /arch/factory
exec /arch/factory/factory
```

FIG.50A

```
MODULEID: PRINTER
MACHINEID: 0x07
VERSION: 1.00
```

FIG.50B

```
MODULEID: SCANNER
MACHINEID: 0x08
VERSION: 1.00
```

FIG.50C

```
MODULEID: FACTORY
MACHINEID: 0x07
VERSION: 1.00
```

FIG.51

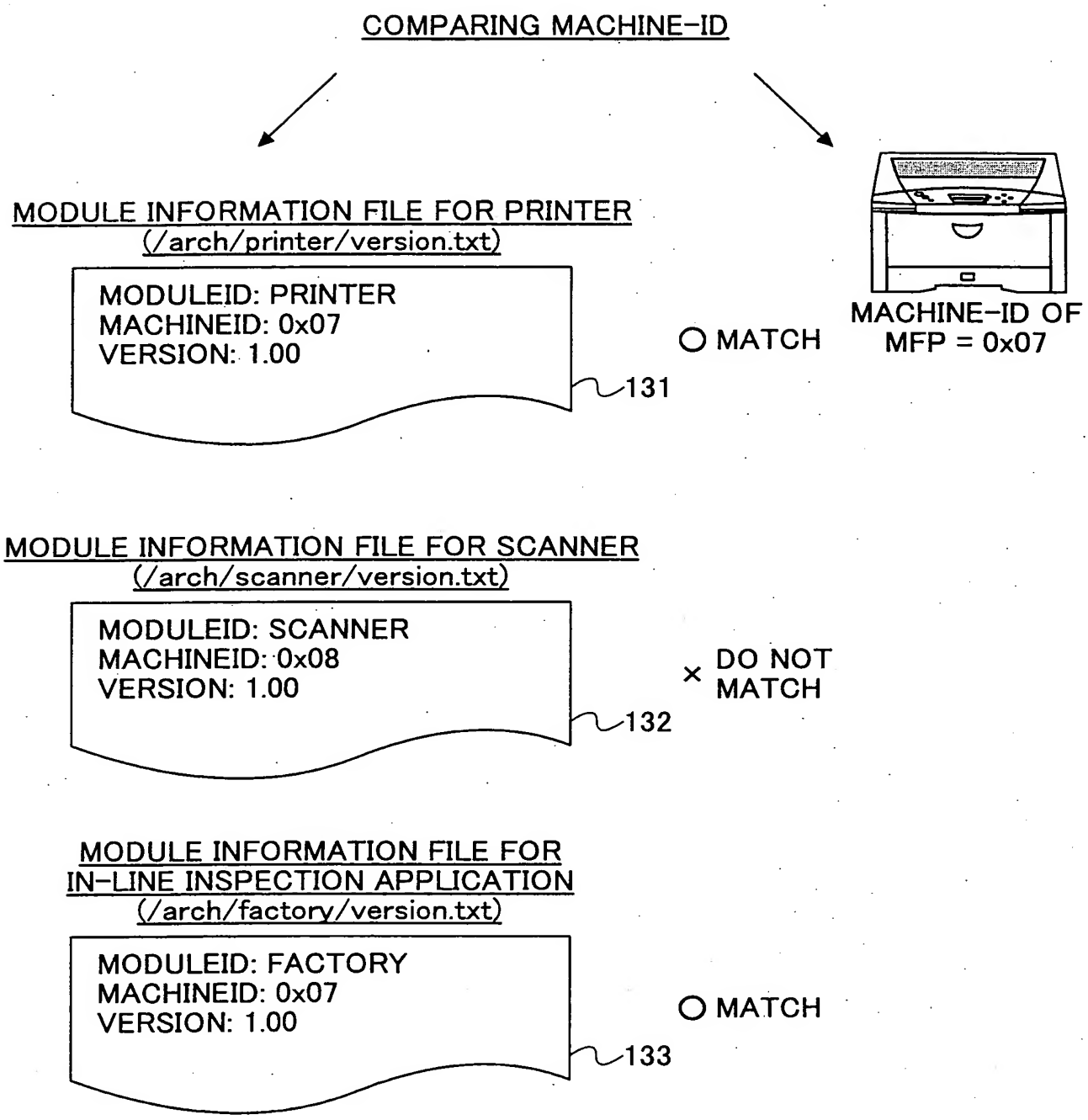

COMPARING MACHINE-ID
MODULE INFORMATION FILE FOR PRINTER
(/arch/printer/version.txt)
MODULEID: PRINTER
MACHINEID: 0x07
VERSION: 1.00
131
O MATCH
MACHINE-ID OF MFP = 0x07
MODULE INFORMATION FILE FOR SCANNER
(/arch/scanner/version.txt)
MODULEID: SCANNER
MACHINEID: 0x08
VERSION: 1.00
132
× DO NOT MATCH
MODULE INFORMATION FILE FOR IN-LINE INSPECTION APPLICATION
(/arch/factory/version.txt)
MODULEID: FACTORY
MACHINEID: 0x07
VERSION: 1.00
133
O MATCH

FIG.52

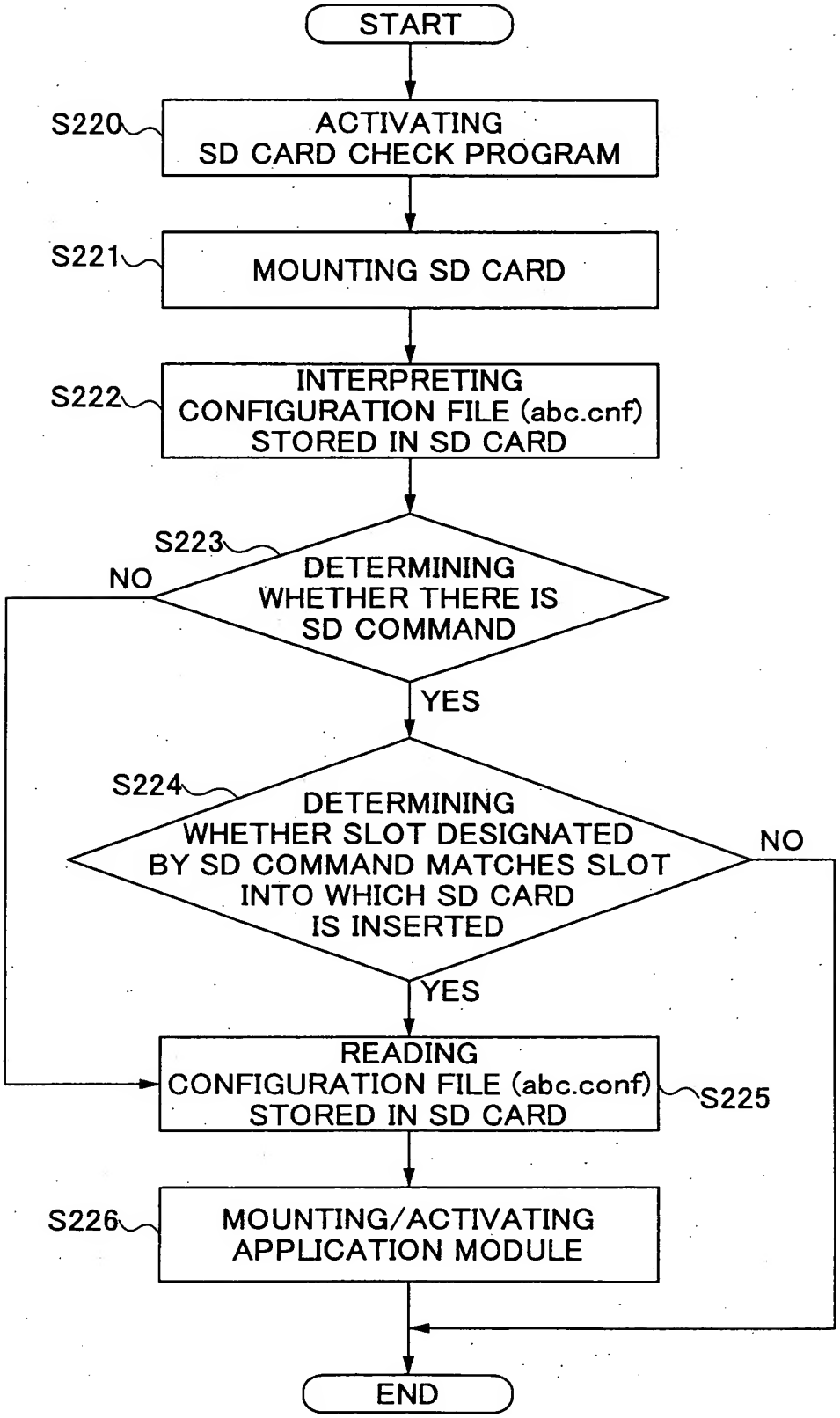

START
S220
ACTIVATING SD CARD CHECK PROGRAM
S221
MOUNTING SD CARD
S222
INTERPRETING CONFIGURATION FILE (abc.cnf) STORED IN SD CARD
S223
DETERMINING WHETHER THERE IS SD COMMAND
NO
YES
S224
DETERMINING WHETHER SLOT DESIGNATED BY SD COMMAND MATCHES SLOT INTO WHICH SD CARD IS INSERTED
NO
YES
READING CONFIGURATION FILE (abc.conf) STORED IN SD CARD
S225
S226
MOUNTING/ACTIVATING APPLICATION MODULE
END

FIG.53

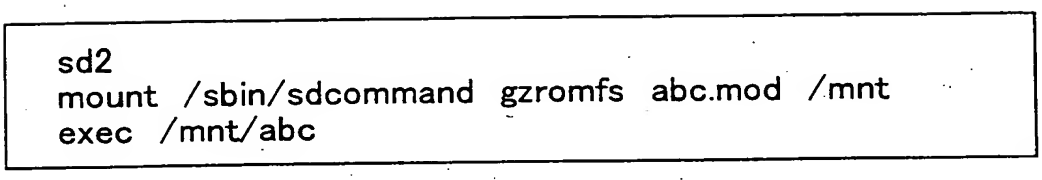
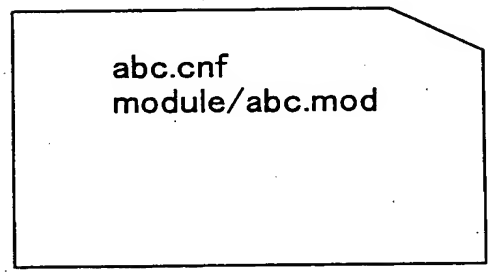

sd2
mount /sbin/sdcommand gzromfs abc.mod /mnt
exec /mnt/abc

FIG.54


abc.cnf
module/abc.mod